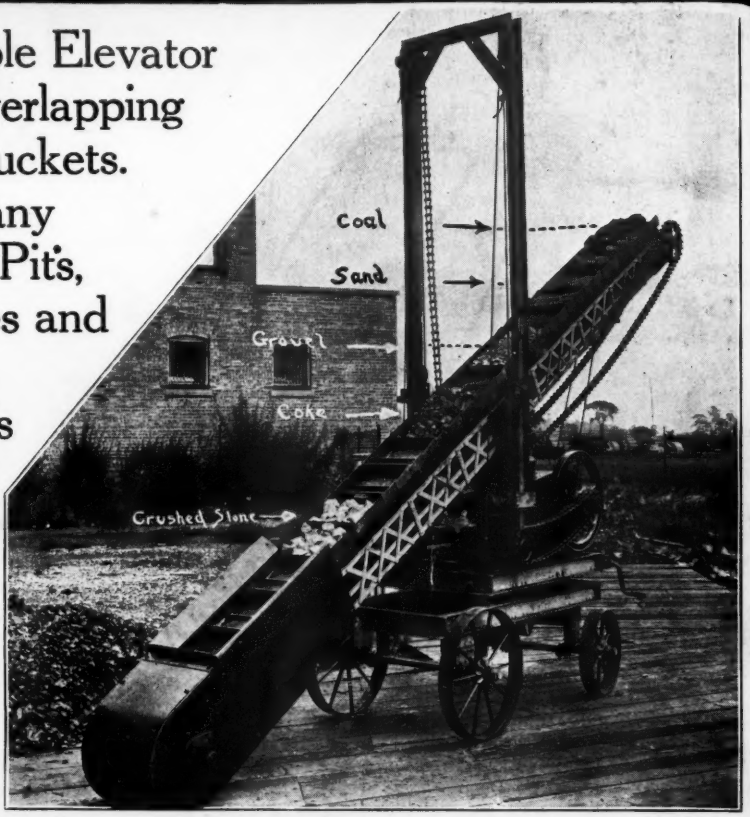
Pit and Quarry

SAND • GRAVEL • STONE

HANDLING • CRUSHING • SCREENING • WASHING

Portable Elevator with overlapping Steel Buckets. Has many uses in Pits, Quarries and Yards. Unloads and Loads Large Capacity. Ask Us



McKINNEY - HARRINGTON CO.

NORTH CHICAGO, ILLINOIS, U. S. A.

October, 1921

Index to Advertisers - - - Page 31
Table of Contents - - - - Page 33

Circulation, 6,700 copies net

"In every respect our best labor-saving device"

Writing us recently the president of the Kalamazoo Vegetable Parchment Co. said, "We appreciate very much the receipt of your catalog, as it gives us a good many ideas which we will undoubtedly incorporate into our new mill.

"We are mighty glad to know that you make other things beside locomotive cranes, one of which we purchased from you some years ago, and which we have found in every respect the best labor-saving device that we have about our entire plant."

If you are interested in the handling of materials we want to remind you that Brownhoist is also interested in this subject. Over 40 years of engineering and crane building experience can be yours on any handling subject. And perhaps we can give you some valuable information, as we did the above company.

The Brown Hoisting Machinery Co., Cleveland

New York Pittsburgh Chicago San Francisco New Orleans

BROWNHOIST

DEDICATED TO QUALITY SINCE 1880

Pit and Quarry

Member Audit Bureau of Circulations
A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime

VOL. 6 CHICAGO, ILL. OCTOBER, 1921 NO. 1

CONTENTS OF THIS ISSUE

If Every Knock Is a Boost, We Ought to Be Thankful! 35
Begin NOW to Establish 1922 Freight Rates! 37
A Coming Virginia Firm 38
Selecting and Arranging Crushers 40
Look to Your Overhead Expenses 43
Wasting Fuel with Boilers 43
Working Men in Pairs 44
Selecting Plant Sites 46
More Men in Quarries 48
Big Blast Hole Drills: A Review 49
Lehigh Cement District 50
Designing Plants 51
The Three C's of Credit 52
Lansing Concern Busy 54
New Trap Rock Quarry 59
Hauls Sand to Frisco 60
Granite Quarries Active 61
Expect Good Fall Trade 62
Eastern Rates Reduced 64
Dallas Business Steady 67
Sand for Fertilizer 68
No Kick in Louisville 70
Reorganize Signal Mt. Cement 71
"In India's Sunny Clime" 72
Changing a Quarry From Hand to Steam Shovel Methods 73
How Costs Should Be Kept 77
New Silica Sand Company 79
Cement Output Increases 80
Final Cement Figures 82

Published Monthly by
COMPLETE SERVICE PUB. CO.
Rand-McNally Bldg., Chicago, Ill.

HARRY W. BAUMGARTNER
President

V. E. LARSEN, Manager

E. S. HANSON Editor
D. J. HAUER, Associate Editor
J. J. FITZGERALD, Associate Editor

that the contractor can put in a bid based on the actual cost of materials, irrespective of market fluctuations.

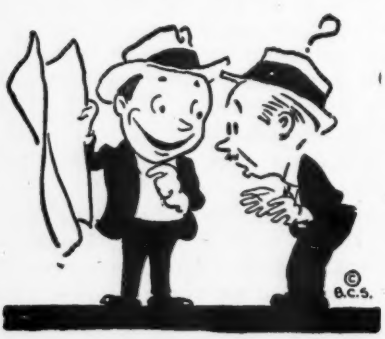
Let us say that A is low bidder on the cement, B on the stone, C on sand, etc. In due course the successful contractor starts the work and A, B and C begin deliveries, billing at the contract price, although the market may have gone up in the meantime. This being the case, it is to their interest to know that the contractor orders only such quantities of materials as the contract actually calls for. He not infrequently is inclined to over-order, diverting the surplus deliveries to other jobs where he would otherwise have to pay the market price, and which are charged to the owner at a figure based on the market price of materials.

We do not know what distortion of law may be made to cover a case of this kind in the avowed interest of the general public; but it is impossible to see how any court founded on the basic principle of simple justice could find such a contract for specific price on a specific job only, as in restraint of trade or contrary to good public policy.

And now, getting back to the matter of "open price" associations, which we mentioned in the first place. A number of such organizations are operating beneficially in the pit and quarry industries. Their broad fundamental principle is that a full knowledge of what the other fellow is doing is for the good of all concerned—even including that much cartooned individual, the common people. There is no Ku Klux about the open price association. It is neither a mystery nor a conspiracy. It tells a member what his fellows have actually sold—not what they have bid on pending contracts. If its tendency can be construed to be in the direction of stifling competition, it is only the cut-throat competition which works in the dark, which takes no account of cost, and which often cannot deliver the goods.

Close co-operation makes for simplification of processes and business methods, eliminates much of the expensive duplication of effort in commercial practice, and in a number of ways works beneficially not only to members but ultimately to the consumer of the product. With regard specifically to the Portland Cement Association, which has been singled out for investigation, there may be much with which we are not familiar. But there are many phases of its activity with which we have been in close touch ever since it began to function and on which we can therefore speak with intimate knowledge.

We know, for instance, that the Association has on its staff a large number of high-class engineers whose sole duty is to develop the intelligent use of cement and assist users in getting the best construction possible. We know that legitimate and helpful methods of promotion have been used, and to good advantage; we do not know of the use at any time of methods subversive of a sound public policy.



We firmly believe that but for the educative work which the association has done, concrete construction would not be at its present degree of perfection, and the demand for cement would be so much smaller as to render it impossible for the manufacturers to sell it at the present figure.

We remember the time in the early stages of the modern cement industry

when frantic competition was rampant, no one was making money, and the whole industry was apparently headed for the demnition bow-wows. It would have gone there, too, had not the manufacturers gotten together in an organized way to standardize their specifications, their manufacturing methods, and their trade practices, as well as undertaking to educate the user of cement, so that their product might be properly handled and take its place in public favor as a standard building material.

Then there is the Gypsum Industries Association, against whom the Federal Trade Commission has recently issued a citation because of alleged unfair competition. The main fault of this organization seems to be that it has chosen to adopt a strict policy of marketing through bona fide established dealers. If that is a punishable offense, there are many manufacturers in all lines who will come in for a large measure of such form of penalty as the Federal Trade Commission may be able to impose. But it has not proven its case as yet.

Begin NOW to Establish 1922 Freight Rates!

REDUCTIONS in freight rates which do not begin to operate until October 1 will not be of much service to the material producers, highway builders, state and county officials, or the public generally, so far as present construction is concerned.

But they will have an immense value in setting a precedent, in directing the trend of rate-making action, in paving the way for a more general and more complete return to normal rates to apply to the 1922 building program.

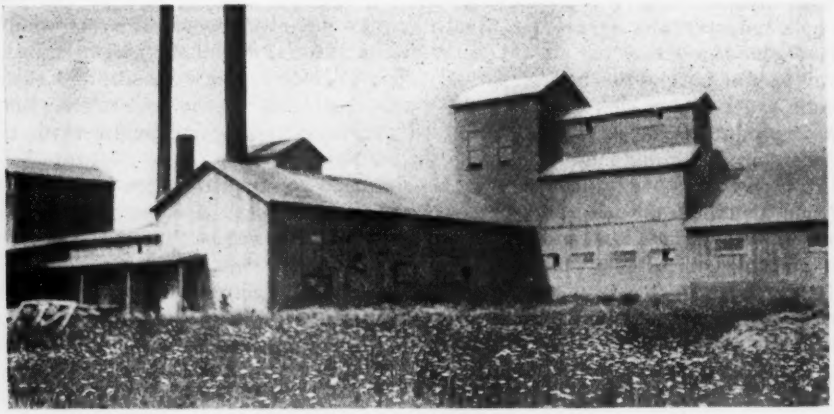
We hope the present reductions, even though coming so near the close of the season, will be followed by some stimulation in tonnage, just for the moral effect which such increased traffic will have on the railroads.

Just between ourselves, it might be suggested that it will be worth while to keep this in mind and get a "pulmotor" or other stimulant into action.

The railroads must learn, so thoroughly that they will never forget it, that freight rates are an unfailing barometer of the business to be derived from the pit and quarry industries. The producer and the railroad man are both interested in such an adjustment of rates as will move the greatest tonnage.

The time for such a general adjustment of rates seems now nearer than at any time since the frantic increases started. It is to be hoped that the matter will not lie inactive during the dull shipping season; for this would probably mean a repetition of this year's program—a reduction too late to be of most service.

What we must have is a settled and reasonably fair schedule of rates worked out before the 1922 shipping season begins—rates which will be sufficiently satisfactory to carry throughout the year without thought of change and the attending uncertainties and hesitations. What we want for 1922 is a program of actual construction—not a period of waiting to see what will happen.



A Coming Virginia Firm

The Claremont Marl Products Co. Helping a Whole Section

IN the Claremont section of Virginia is a deposit of marl the economic importance of which does not seem to be properly appreciated. In fact, even in quarters where there is little excuse for the absence of exact information not enough is known of this boon which Nature has conferred upon a whole section of our country.

But there is one little group of men who are working valiantly to gain for this splendid Virginia marl the recognition that it deserves. The Claremont Marl Products Company ,with 400 acres of land containing deposits in excess of 16,000,000 tons, are energetically pushing the work of manufacture and sale. Their ideals are high. They are out to make their section as important, in its own way, as the Pocahontas coal fields, the Joplin lead mines, the Demopolis cement rock district, and the Calumet and Hecla copper mines. A hint on their progress is contained in the statement that, already, a ton of their Marlime at the quarry is worth more than a ton of bituminous coal at the mines.

The company has a working capacity of 100 tons per day, about seven cars, the total normal freight tonnage of the Claremont branch line before the Marline shipments came.

The marl is dug from the quarry by an Erie Steam Shovel and carried by dump cars to the rotary drier and pulverizer. Here all moisture is taken out and the material finely crushed. Its economic value is greatly enhanced by these last operations, for Marlime is used almost exclusively for agricultural purposes and must be in condition for even distribution on the land.

The problem of neat and economical handling is solved by bagging the lime with a Bates Bag Packer. The product thus reaches the farmer in packages that are most convenient for him.

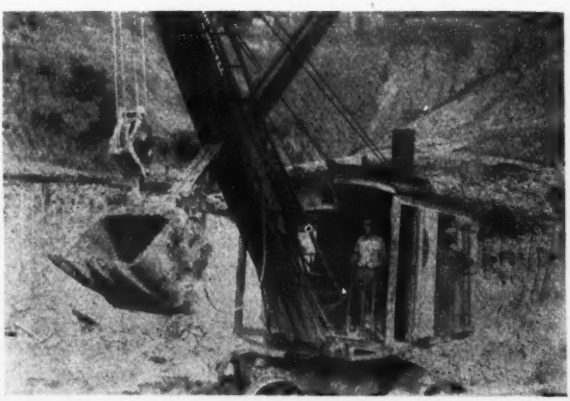
The Claremont Marl Products Company has been operating for about a

year and a half and the enthusiastic efforts of the men who are behind the project are bringing results. The very fact of their being in business is a distinct advantage to the section, for the tonnage they are turning over to the railroad entails a reverse haul and is highly constructive. This last may not seem important until one reflects that the railroad tonnage of tidewater Virginia is mainly outbound and essentially destructive to the territory traversed, as it means denuding that territory of raw and semi-raw materials without compensation by forms of traffic designed to repair the waste.

But Marlime moves in the other direction and is used to maintain the fertility of the section by supplying an acute need for agricultural lime. It also helps to fill the empty cars traveling back between outbound hauls.

The Claremont people believe in publicity and hold with PIT AND QUARRY that producers should make greater efforts to keep their names before the people they serve. Evidence of this belief is furnished by the large board sign at the entrance of their plant.

Mr. W. H. Dorin, secretary of the Company, has also prepared a circular and a twenty-page booklet which effectively set forth to the farmer the advantages of Marlime as a cheap and reliable aid to fertility.



Selecting and Arranging Crushers

BY DANIEL J. HAUER

MANY quarries built some years ago, and even some developed within the past few years, have poor crushing plants—poor due to installing the wrong type of crusher or in placing ones that are too small.

As crushers are heavy and expensive pieces of machinery, it is difficult and costly to replace them. For this reason, it is sometimes necessary to add to the crusher plant rather than to tear out the old and put in a new one.

The development of crusher plants in this country during the past 15 years has been rapid. In the same time the sizes of crushers have increased considerably. The modern plant, if properly selected, can produce stone in large quantities and cheaply, and, better still, so that the overhead expense is small per ton of stone produced. Thus, in one quarry, by a change in the crushing plant the output was more than doubled, cutting down the overhead charges about 50 per cent.

At one time the almost universal custom was to use one crusher to a quarry, returning the tailings to the crusher to be recrushed. Then, in order to increase the capacity of the plant, a second crusher was installed, either the same size or slightly larger.

It was found that in order to get large crushing capacities, the crusher jaws should not be set too close. Thus, there was a large amount of coarse rock that would not grade through the screens, and could not be readily recrushed by the large crushers. This brought into practice the use of a third crusher, to take care of the coarse stone and the tailings.

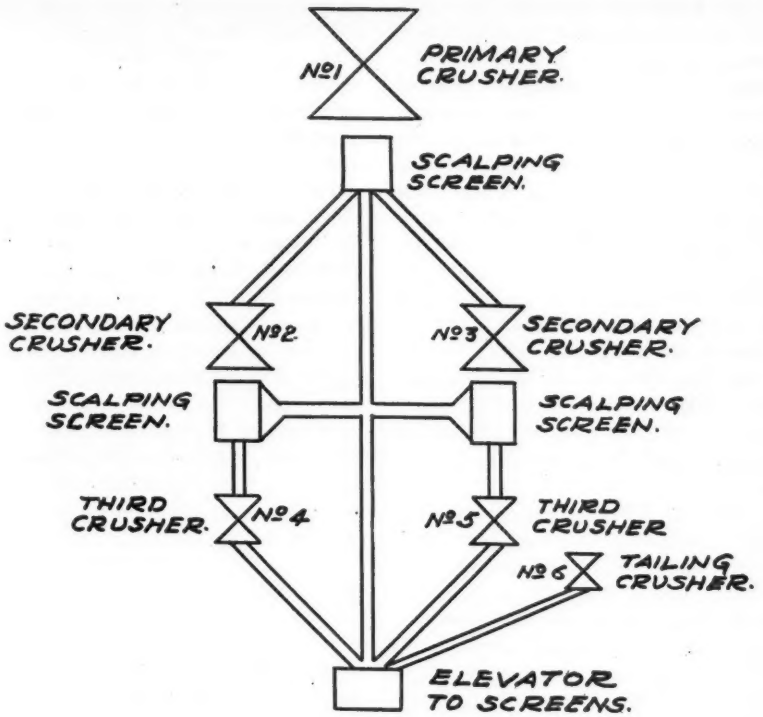
These conditions existed as long as crushers were hand fed and it was the custom to pick up stone at the ledge by hand. When steam shovels began to be used for loading cars to feed crushers, then small crushers meant excessive cost in breaking up boulders, which could be obviated with the steam shovels. Thus the need of what was once considered as excessively large crushers came into use, crushers that would take stone weighing from two to ten tons.

This has been the gradual development in crushers, until today all large plants will have two or three sets of crushers and possibly one small crusher to do the recrushing of the tailings.

If it is desired to make as little fine stone and dust as possible, the smaller sizes of stone are screened out as soon as they come from the crusher, but if this fine stone and dust is not objectionable or finds a ready sale at a good price, then all stone coming from the first crusher is passed through the second crushers and so on through, until they reach the screens.

Thus, with a modern crushing plant there will be a large primary crusher. This may have a capacity of 300 to 500 tons per hour, yet this capacity may never be developed. Such a crusher may be a large jaw crusher. These are made with openings of 66x86 inches, taking as large or even a larger stone than some of the gyratory crushers will. Gyratory crushers are also used as primary machines. A third type of crusher for a primary is a set of rolls. These will also take very large boulders.

From the primary crusher the stone will go to the secondary crushers. These are generally two in number and may be of any of the three types mentioned. The additional crushing necessary must depend upon the size of the secondary crushers. If these are of large capacity and set for



coarse stone, then they will allow fair size stones to pass through them and the greater part of the stone will have to go through a third set of crushers. It may be that tailings can be returned to one of these crushers, while in some cases a small crusher, possibly a disc machine, will be used for this purpose. Thus there may be four stages of crushing.

If the primary crusher can be run to something like its capacity, then it may take a battery of two of secondary crushers. These two machines may have to discharge into two additional crushers. Thus, with a tailing crusher there may be six crushers in the plant. This is shown in Fig. 1.

From this diagram it is possible to show any arrangement of crushers that may be desired or found practicable.

If one secondary crusher is sufficient to take care of the output of the primary crusher then the three crushers on the right of the diagram can be cut out and only three crushers remain.

If the secondary crushers can produce stone fine enough then the two third crushers and possibly the tailing crusher can be eliminated.

This diagram can also be used in building a crusher plant where it is desired to plan a plant to ultimately produce a large tonnage; yet at the start to do hand loading at the ledge, producing only a fair tonnage.

Thus, at first, crusher No. 2 and No. 6 could be installed. As money is earned, crusher No. 4 could be insalled and No. 2 could be opened up to pass more stone through it.

Later as a steam shovel is put at the ledge, Crusher No. 1 could be installed. This would mean to save money at the ledge in several different ways, and to slightly increase the output of the crusher. No. 2 could be made to

give its maximum capacity, the output of the plant being limited to the capacity of this one crusher. Later, crusher Nos. 3 and 5 could be installed and the output of the plant would be limited to the capacity of crusher No. 1. All of this is based upon the assumption that the elevating and screening system is arranged at each stage to keep pace with the crushers.

Again, if a man has a small plant using but one crusher, say crusher No. 4, he can increase his capacity by installing crushers Nos. 2 and 5. With the earnings thus made, be can later install crushers Nos. 1 and 3, increasing within four or five years from an antiquated plant to a modern one of large capacity.

In one case an operator had a crusher plant with crushers Nos. 2, 3 and 5 installed. He learned that to run No. 5 was a waste of money, because tailings could be cared for by crusher No. 3. By hand methods he was never able to produce much over 60 per cent of the combined capacity of the two crushers, Nos. 2 and 3, generally less than 50 per cent. Business increased and competition compelled him to cut down the production cost. His remedy was to change his methods of loading at the ledge, and install crusher No. 1. This allowed him to produce the maximum capacities of crushers Nos. 2 and 3, and No. 5 was brought into use to crush the tailings. Thus an obsolescent plant was made modern.

In the diagram, three scalping screens are shown, one each installed in the crushers Nos. 1, 2 and 3. These screens have perforations as large as the maximum size of the stone to be graded. Thus, everything ready to be graded by the grading screens is taken out by these one-section screens and carried to the elevator either by chutes or conveyors. This means that stone that does not need recrushing is not passed through the other crushers, and this increases the output of each succeeding crusher and saves power. By these scalping screens it is possible to increase the output of a crusher plant from ten to twenty-five per cent, depending upon the character of the rock and the size and layout of the plant.

This short article deals alone with the general layout of a crusher plant. The types of crushers to meet varying conditions best will be discussed at a later date.

The logical and economical location of each crusher is a matter that must be decided by the local conditions at each plant. It is difficult to discuss this subject in a general way, but as it is important, the writer hopes in another article to cover some general principles that are applicable to most crusher plants.

To Work Big Gypsum Deposit

The California Gypsum Corporation has been formed at Los Angeles with an authorized capital of $3,000,000. The foundation for the enterprise is in the ownership by this corporation of 1,200 acres in Imperial County, twenty-two miles northeast of El Centro. In this tract are 600 acres containing some of those great chemical or nonmetallic mineral deposits which are just beginning to be understood in their relation to industrial development. These gypsum deposits in Imperial County, owned by the California Gypsum Corporation, are veritable mountains of wealth, are fully exposed so that they can be cheaply mined by the steam shovel process, are pure and almost entirely unmixed with foreign matter needing extraction or refining and are almost inexhaustible in volume. The exposed gypsum is estimated at 200,000,000 tons to the floor level, with the quantity below this level still unexplored, and its ultimate depth unknown.

The Cumberland Cement and Supply Company is the outcome of a merger just effected at Cumberland, Md., of the Cumberland Hydraulic Cement and Manufacturing Company and the Builders' Supply Company.

Look to Your Overhead Expenses

TODAY business is being readjusted in nearly every line, including the gravel and sand business as well as that of producing crushed stone and other quarry products. Prices are falling in some localities and holding their own at other places, but it is not altogether a question of prices, but a combination of prices and production.

Thus, if a quarryman can still get the same price for his products that he did two years ago, but is only producing one-half as much stone for sale, his business cannot be run on the same basis.

This is evident from one viewpoint alone. If a company is making 50 cents a ton profit and their overhead charges for their usual production equals 50 cents per ton, then to cut the production in half, the overhead costs remaining the same, the unit cost for overhead becomes one dollar per ton, thus doing away with all profit.

It is possible under either good or bad business conditions for the overhead expense of a business to be so large as to ultimately ruin the business. The writer has been called upon a number of times to make a losing business pay and he has found that one of the heaviest costs was that of overhead charges. This cost is one of the most difficult for a stranger to the organization to handle.

The high charge may be due to the large salaries paid the officers of the company and to the office force and superintendent. It may be due partly to expensive offices and the things that go with them, or it may be due to excessive selling costs.

When these conditions exist, it is time to take note of them and make such changes as will reduce these expenses until they are such as the business will stand.

If, in times of business stress, the overhead expenses are adjusted so as to show a profit, it is evident that the overhead expense will be reasonable and handsome profits will accrue when business picks up and prices again become good.

Wasting Fuel with Boilers

"THE water for my boilers costs me nothing," said a quarry operator. "You see there is a large spring on the side of the hill about 100 feet above the boilers, and I lined this spring with concrete years ago, ran a pipe line to my boiler room. There I have several barrels, from which the injectors pick up the water and put it in the boilers. Nothing could be cheaper than that."

The cost that this man could not see was in his coal bill. He was injecting cold water into his boilers, reducing his steam every time he started the injector, causing the fire doors to be opened and the fire stirred up (a further loss of steam), and the throwing into the fire box of a lot of coal. This means the wasting of a hundred or two pounds of coal for every ton used, certainly a constant expense, and one that amounts to a good many dollars within a year.

The installation of a water feed heater would call for the use of some of the waste steam to heat the water so that, when it is pumped into the boiler, it will have a temperature of nearly 212 degrees. This is near the boiling point and will not appreciably affect the temperature of the water in the boiler. It may mean the expenditure of some little money to make the installation, but once made, the cost of operation will be reduced to such an extent that the installation will be paid for by the saving effected, and each year the saving on the coal bill will pay a handsome dividend on the investment made.

Working Men in Pairs

IT is quite surprising when visiting sand and gravel pits and likewise quarries to note that in many cases men are doing certain tasks alone. It is necessary in some cases for one man to do certain work by himself, for the job is meant only for a single workman. This can be the case in firing boilers, attending to a pump or some other job that will keep only one man busy a part or all of his time. But in most work it is possible to have men employed in pairs and in some cases three or four and even more men working together.

There is a decided disadvantage in having one man working by himself. Unless he is serving some machine or taking the product from a machine that will set the pace for him, he is apt to labor at a slow pace, for one man can seldom work at top speed. He needs some one to help him enthuse over his work, to spur him on, or to start competition with him. It seems that this fact is not generally known, but it is very true. Only in rare cases will a man do more work by himself than with a companion.

Some years ago the writer picked out of a large crew some of the best and most reliable workmen, laborers who could be trusted to do an honest day's work without continual supervision. These men were tried for several days working by themselves on different kinds of work, and a record was kept of each man's work. The work selected was unloading cement from a car, hauling it on a dray about 200 feet and stacking it in a cement shed; excavating from a trench about eight feet deep; loading sand into a cart; and loading crushed stone into a cart.

One man took 20 hours to handle 160 bbls. of cement, while he and another man did the same work in 8 hours, or in less than one day or a total of 16 hours. This meant a 25% saving.

One man in the trench excavated 10 cubic yards of light soil in 10 hours. The same man with another man working within a short distance of him excavated 14 cubic yards, while the second man excavated 13½ cubic yards. This meant nearly a 40% increase in work.

One man working at loading sand from a bank into a cart handled sand at the rate of 12 cubic yards in 10 hours. The same man with a second laborer loaded at the rate of 16 cubic yards; that is, two men loaded 32 cubic yards in 10 hours. This was an increase of one-third per man.

One man loading crushed stone into a cart handled 10 cubic yards in a 10-hour day. When a second man was put helping him each worked at a rate of 11½ cubic yards, so that they handled 23 cubic yards between them, an increase of 15%.

Many other records could be given showing the difference in speed of unloading coal from cars, digging dirt, breaking rock, loading rock into small cars and skips and many other classes of work, and in nearly every case two men did the work at a lower per capita cost, than one, although there are some exceptional records where a single man worked at a speed exceeding that of men working in pairs or in a crew.

For instance, a sand dealer unloading and delivering sand from cars, by paying his drivers a good bonus, has had a single man unload forty to fifty tons in a day. But here there was a special incentive to put forth extraordinary effort.

The writer has had in his employ some exceptional workmen, men who ranked away above the average. These men working by themselves would do

good work; but even they would, as a rule, do better work with a companion.

One man, a short, stockily built Englishman possessed of wonderful endurance, made some remarkable records working by himself, and he preferred to work alone rather than be alongside of an indifferent laborer. Yet, if he worked for several days by himself, he became lonely and wished to have companionship. If it was not given him he found it by going off on a drunk.

This man, though, could increase his own speed if given a good working "buddie" and the other man, enthused by the speed of the Englishman, would do more work. So, even in this case, it was found more economical to work this man with a partner.

It must be borne in mind that the records given in this article are in every case those of the same man with another good man added. All of the work was done under day's wages, without a bonus.

If the work is by contract or piece work, it is sometimes more difficult to get men to work together than when day's wages are paid. At any time a good laborer wants the man alongside of him to keep up his end, but when it comes to contract or piece work a good workman does not want to feel that some of the money he is earning is going to another man. Thus on work paid for in this manner it is more difficult to get good men to work in pairs than when ordinary wages are paid.

With this method of payment in force it would seem to be a matter of indifference to the employer whether men worked in pairs or alone. However, it may mean much to him. Suppose a quarryman is paying men a contract price or piece rate to load skips or cars at the ledge. Say twenty men are employed, each working by himself. This means twenty or more vehicles to keep these men employed continually. If two men worked together only about half the number of vehicles would be needed, a decided saving in overhead.

If by working the men in pairs the total output of the entire force could be increased ten per cent only, this may mean twenty to thirty additional tons of stone crushed per day. The loading cost per ton would remain the same but all the other costs would be decreased ten per cent, so that there would be a decided saving.

It is common among workmen for two of them to go together; in other words, they are "buddies." These will often work together, even if they are not matched or equal in their working capacity. The main thing is to get men started working together. If they are allowed to change partners the employer is likely to find that, after a few weeks or a month, the men have paired themselves off to suit their own purposes. As new men come to the job they can be placed with the best judgment possible and then be allowed to change to suit themselves. It is this freedom to change that should solve any objection to working in pairs.

Now that labor conditions are changing again, it is possible to do things with workmen that could not be done several years ago, and the writer believes that, if judgment is exercised, this is one of the things. If changes are made now in handling men, it may be that for some years to come men can be worked along the new lines laid down. One of these should be the working of men in pairs instead of alone.

The United States Gypsum Company retired its $1,000,000 five year 5 per cent debenture gold notes, which matured Sept. 1, from cash in the treasury. This payment was made from accumulated earnings and without refunding or banking aid. This makes $1,500,000 in obligations to be paid off since 1912. Current earnings are reported to be equal to last year.

Selecting Plant Sites

BY DANIEL J. HAUER

FEW pit and quarry operators select many sites for plants. If they build two or three or at most half a dozen, they have done much of this kind of work. Experts in such lines today may spend most of their time in selecting plant sites and building plants, thus having to do with a dozen or more in a year.

Much may depend upon where a plant is located as to the pit or ledge —not so much at the start, but after considerable development has been made and over a long term of years of operation, causing a waste of much money.

It is surprising, in visiting plants of all kinds in the field covered by PIT AND QUARRY, to note how many of them have been placed in the wrong position. This is not stated without due thought and care, for the writer has been engaged in most cases to study many such a plant, show how it can be improved and cut out wastes due to former mistakes.

Many operators do not seem to consider the future development of the quarry or sand and gravel plant, in selecting a plant site, the idea being that it suits the present needs and may be economical at the time. This is evidenced by a visit to a quarry during the past season where a new plant has been built. Already the operator had realized that in a year or two it would not be economical to operate the plant where located, and was planning a new plant located at an entirely different place, a site that would suit his operations for as long a period as his rock would last. Some excuse may be offered for this man, as he had never been engaged in quarrying before, and he had learned from his mistake.

In another case a sand and gravel pit was opened up and the site of the plant was selected without making any soundings. After building the plant and starting developing, clay was struck on one side and when borings and test pits were put down over the land it was found that the plant was located wrong and to keep it at the original place would entail a heavy extra expense in transporting the product. Within two years the entire layout was changed and what gave promise of being a losing venture was changed to a money-making one.

Another interesting example was in a large quarry operation. A plant site had been selected and the quarry opened up. After operating a short time the officers of the company decided their plant and methods were wrong, and decided to change them. A new plant site was selected and development started, and after spending some little money they called in an expert to assist the company in deciding upon the many features of their project.

The expert, after spending some time in going over the plant and considering the working of the quarry for a term of more than 25 years, pointed out three possible sites for the plant and its future addition, and the one selected by them was the poorest and little better than the one they had at first. It was not as cheap in the initial cost as were other sites, nor could any extensive additions be made to it. The owners, after following the report and recommendation of the expert, realized that he had saved them from another mistake, this one item paying for his services many times over.

Hard-and-fast rules cannot be set down for selecting sites for plants, for every quarry and sand and gravel pit

presents different problems in excavation, transportation, grades and other features. But it is possible to set forth some conditions that should be considered in selecting plant sites.

1. Where heavy blasting must be done the plant should be located so as to be out of the way of the blasting.

2. No matter how long the operations may be carried on, even if it may be fifty years or more, the transportation of the raw products to the plant must be considered so as to equalize the hauls over a term of years and keep this cost down to a minimum.

3. The grade of the roadbed to the plant will play an important part in the economy of operation. A common mistake is to have inclines too steep, for the power needed to bring cars up is excessive, and the speed will be slow.

4. The plant should be located so that both trucks and railroad cars can be gotten to it to load the products. It may be at the time the plant is built that trucks will not be used, but car shortage may occur or local business may develop so trucks must be used. Or railroad facilities may not be needed at the time, but afterwards be a necessity.

5. There must be room provided for extra storage of products to tide over adverse working conditions. Also room for storage of coal if this fuel is used.

6. Consideration must be given to future changes and additions to cover a long period of years. Not only must the selection of the site be a factor in this but the design of the structure and the arrangement of the plant. To ignore these things may mean the spending of many extra dollars in enlarging a plant. Many examples of this could be cited, as to enlarge most plants means to practically rebuild them or else build two units not easily connected.

7. A water supply for the plant should be given consideration, but this should not unduly influence the site. Fire protection is a matter that should be a governing factor.

8. If it is possible to have water transportation from a plant, this should be a deciding factor in selecting the site.

9. In locating the power plant, consideration must be given to preventing excessively long steam and air lines to different items and units of the plants.

10. Plants should seldom be located below the surface of the ground or in deep pits. It is seldom practical to do this and the cost is likely to be more to elevate the finished products to the ground than the raw materials.

11. Plants on side hills and mountains should be located below the floor of a quarry or a gravel or sand bank.

12. The contour of the ground should always be considered in selecting the site of a plant.

Remember that plants are seldom built for a few years, but are meant to work out the available deposit. This may mean the working in one site for the period of a man's life or even longer. The writer knows of one large quarry in the east that has been worked for more than 80 years. It has had plants built on three different sites. The last plant built is located so that the project can be worked many years, possibly until the rock deposit is exhausted.

Cement Prices Down

The Universal Portland Cement Co. announces a reduction in its selling prices for Universal portland cement, effective September 15, of 20 cents per barrel at its Chicago plant and 15 cents per barrel at its Pittsburgh and Duluth plants. This is the second price reduction made by this company this year.

The Southern Gypsum Co., North Holston, Va., has arranged for an increase in capital from $500,000 to $750,000 for proposed expansion.

More Men in Quarries

Increase In Employment of 8 Per Cent In 1920

REPORTS received by the United States Bureau of Mines from operators of limestone quarries throughout the country show that the industry employed 43,151 men in 1920 for an average of 259 days each, or 11,154,653 shifts for all employees. These figures indicate increases as compared with 1919 of 8 per cent in the number of men employed, 12 per cent in total shifts worked, and 4 per cent in average working days per man. There was also, unfortunately, an increase in accidents, the reports showing that 96 men were killed and 5,321 were injured, or 31 more deaths and 890 more nonfatal injuries than occurred the year before. The accident rate was 2.52 killed and 143.11 injured per thousand men employed (300-day workers). The corresponding rates for the previous year were 1.97 killed and 134.05 injured.

Men employed in the quarry pits proper, as distinguished from the crushers, or outside rock-dressing plant or mills, numbered 29,226, and worked 7,343,112 shifts, or 251 shifts per man. Those employed at the outside plants numbered 13,925, and they worked 3,811,541 shifts, or 274 shifts per man. Accidents inside the quarries caused 74 deaths and 3,590 nonfatal injuries, while those occurring outside the quarries resulted in 22 deaths and 1,731 injuries. The accident rates for the quarries proper were 3.02 killed and 146.67 injured per thousand employed, corresponding with rates of 2.24 killed and 136.44 injured for the previous year. For the "outside" works the rates were 1.73 killed and 136.25 injured, as compared with 1.40 killed and 129.04 injured in 1919.

Of the principal limestone-producing States, those showing decreases in accident rates during the past year were Michigan, Texas, West Virginia, Virginia, Maryland, Indiana, Missouri, Oklahoma, and New York, while increased rates were noted for Kentucky, Pennsylvania, Illinois, Ohio and Alabama. Michigan showed the most notable reduction in the accident rate, the decrease in the number injured being equivalent to 66 for every thousand men employed. The largest increase in the injury rate was in that for Kentucky, there being 52 more injuries for every thousand persons employed in 1920 than in the year before.

Considered by causes, practically all classes of injuries occurring inside the quarries were more numerous than in 1919, except in the case of falls or slides of rock or overburden, which declined from 349 to 322, and injuries resulting from burns, which fell from 70 in 1919 to 59 in 1920. The net increase in injuries occurring inside the quarries was 538. The net decrease in accidents at the plants outside the quarry pits was 352, and the only injuries showing a decrease were those caused by handling rock by hand, which fell from 83 to 40. Accidents from electricity at the outside works injured 26 persons, the same as in 1919.

Limestone quarries usually employ about 50 per cent of all quarry workers in the United States. The principal producing States are Pennsylvania, Ohio, Michigan, Illinois, Indiana, New York, West Virginia, Alabama, and Missouri.

A number of new buildings at the quarry of the Bay of Fundy Granite Co., St. George, N. B., in the Lake Utopia section, were destroyed by fire on September 7, with considerable loss. The fire also damaged a considerable quantity of new machinery, recently installed. The structures and equipment will be replaced.

Big Blast Hole Drills: A Review

IT has been stated that the best review that can be given a technical book is a sketch of the life work of the author. If this is true, then a new book or catalog entitled "Big Blast Hole Drills," a semi-treatise on blast hole drilling, just published by the Sanderson-Cyclone Drill Co., of Orville, Ohio, can be commended, for the Sanderson-Cyclone Drill Co., a pioneer in this class of work, claims to be the first manufacturer to convert the old style well drill into blast hole machines.

A bit of history is always interesting, and today deep blast hole drilling has become so common that the busy men of today have forgotten the crude methods followed a decade or two ago.

The writer remembers sinking blast holes 60 and 70 feet deep by the old churn drill methods, using a steel bit welded to pipe. First three men were used, then six, and as the hole got to be 40 feet nine men pulled the drill. Platforms and scaffolds had to be built for the men to work upon, and the drilling was both slow and expensive. A well drill was substituted for this crude method and also to save taking high ledges down in steps with percussive drills, and these well drills showed economical results.

The Sanderson-Cyclone Drill Co. heard of these results and at once got out a different drill point and string of tools to suit the new conditions; and as experience pointed out other changes, these were made in the machine, so that quarrymen, miners and contractors had a machine built especially for deep blast holes. It is little wonder that the experience thus gained has led this company to get out in the form of a catalog a treatise on blast hole drilling.

The book, gotten up in artistic style, is well illustrated with photographs. The book is divided into two parts. In all there are 96 pages, 9x12 inches in size. The first 64 are given over to details of drilling, while the last 32 pages are the catalog proper of the cyclone drills.

The first section treats of "The Big Hole Method, Its Origin and Development." This is followed by "The Advantages of the Big Hole Method over Other Systems," comparing this method with those of benching, snake holing, and tunneling.

Then "Factors and Conditions that Govern Big Hole Drilling" are discussed, followed by "Physical Properties of the Rock." This leads up to the "Physical Characteristics of Quarries, Mines and Rock Cuts" and the arrangement and spacing of drill holes. Much data is given on this important subject and several valuable tables.

This is followed by eight pages on costs and cost keeping, even giving some examples of cost record forms. Then 22 pages are devoted to the requirements of the big blast hole drill and how the Cyclone meets these requirements.

In the catalog proper, machines and tools are described and illustrated.

Literature on deep blast hole drilling is meagre, so that all interested in the subject will welcome this book, for it is well written and covers many details and gives both the man operating a drill as well as his employer a vast amount of information that if applied to rock drilling will mean the saving of much money.

The purpose of publishing this book is clearly set forth as two-fold:

First: To give complete information on the fundamentals and essential factors of Big Blast Hole Drilling.

Second: To present a detailed description of the Cyclone No. 14 series of Big Blast Hole Drills.

Both of these things have been well done. A copy of the book can be obtained by asking for it. D. J. H.

Lehigh Cement District

Practically All Mills Now Operating—Freight Reductions Help

WITH the turn of the fall season, cement production in the Lehigh Valley section of Pennsylvania bids fair to take on increased proportions. Practically all of the mills in this district are now operating, some at close to normal and others at a point averaging as low as 50 per cent of regular output. Labor is plentiful, and there is no difficulty upon the score of manning the mills to the point desired both with skilled and common workmen.

At Northampton, the Atlas Portland Cement Co. is operating well over 60 per cent of regular capacity at its different mills. On September 12, the company started up its No. 2 mill, which has been idle for about eight months past, and will give employment to several hundred men for an indefinite period. The company has been concentrating production at its Mill No. 4, the largest unit of the plant, for many months past; this plant is averaging well on output, and heavy shipments have been made recently. Under normal conditions, employment is given to about 6,000 men at the Atlas mills in this section.

The Giant Portland Cement Co. is maintaining good production at its mill, as is the Coplay Cement Co., at Coplay. In common with a number of other producers in this section, the company is being charged excessive power rates, it is held, and a test case is now being developed; if successful, this will result in a general lowering of the present electric power charges as made by the Pennsylvania Power & Light Co.

As a result of the recent decision of the Interstate Commerce Commission, lower freight rates will obtain from the Lehigh Valley section to a number of New Jersey points from now on, as will also, increased rates to certain points in the state, as arranged under a new schedule. The rate to Jersey City and Hoboken has been advanced from .39 to 43 cents; to Elizabeth, near Newark, reduced from 43 to 37 cents; to Plainfield, reduced from 49 to 39 cents; and similar variations in a number of other instances, including Paterson, Somerville and different inland New Jersey points. The rate changes will not have any effect in the price of cement at New York, as the figure is based upon the prevailing Hudson district freight rates, which include 30 cents for lighterage. The reductions, where effective, will make for a fractional variation in the local prices of cement to the consumer in the Jersey districts.

Oregon Rates Down

Substantial Reduction in Freight on Road Building Materials

Reduction in the freight rate on highway building materials ranging from about 5 per cent for long hauls to about 33 1-3 per cent for short hauls, were made recently in an order of the public service commission of Oregon. Sanr, gravel and crushed rock are mainly involved. The proceeding was brought upon motion of the commission and at the instance of the state highway commission and a number of county courts. The order is general and applies to all shipments of the materials regardless of whether they are for state construction.

Because of extensive road building operations in the state the case has attracted wide attention. The new rates are about on a parity with those existing prior to the nation-wide increase of about 25 per cent in freight rates made on August 25, 1920.

Various commercial interests also petitioned the commission for a decrease in the rates. All common carriers in Oregon are affected.

Designing Plants

THERE comes a time in the history of most plants for the production of sand and gravel and also for quarry operations, when the plant is not equal in capacity to the production desired or it is not economical enough in operation to net a profit and meet competition.

Under such conditions the operator has a serious problem to solve, not only from a financial standpoint, but likewise from an engineering and operating viewpoint.

The question arises at once whether the old plant should be scrapped, or whether it should have additions made to it or otherwise improved.

If every part of a plant has become obsolete and delapidated, it would seem proper to scrap the old plant or otherwise abandon it and build a new one. This may not be the practical course for a number of reasons. First there may not be capital available to make the change, nor may the business conditions warrant shutting down the plant for a long period of time; and again a part of the plant may fit in with the new design, or the old plant may be made a unit of several such that may make up the new plant.

If an entirely new plant is to be built, then the first consideration to be given to the project is the site for the new plant. In some cases the site of the old plant is the logical one for the new plant, but in a very large number of cases, the old site has been poorly selected and is ill suited for the entire project. Thus it becomes possible to rectify the mistakes of the past and place the plant at the best possible site for the present work and future development.

If there are only additions and improvements to be made, then little can be done to better any conditions as to the site, but it is possible to rearrange the operations of the plant so as to reduce costs and increase the capacity.

How to do this is the next question. The ordinary operator builds one or two plants in a lifetime, some others may build three or four, while a few may have even built more.

Then too, the operator is busy at his own plant attempting at all times to keep it up to a standard and make money. This prevents him from spending much time in visiting other plants. All of this means that if the operator depends upon his own judgment alone, although he may know just what he wants in a general way, he is not likely to get a design that will be the most economical nor will the plant be all that it should be as to the many details that will make it up to date and give the best results.

Assistance in this connection can be obtained from manufacturers of various kinds of machinery, and such information is not to be despised, but the engineers of different manufacturers do not always agree, so that unless everything is furnished by one manufacturer the plant is not likely to be well balanced.

A reader of this journal writes asking what is the best method to follow in designing a new plant or re-designing an old, setting forth what has been written in a general way in this short article.

The answer to this inquiry is, to engage an engineer to do this work, not simply an engineer, but rather one who has had experience in not only designing but in operating such plants. Such a man may design a dozen or more plants in a year. He will be continually visiting plants and will thus be posted as to the latest machines and the best methods of operation. He will not only design a plant for the present but also one for the future, so that additions can be made or new units added. The services of such a man will pay for themselves many times over.

The Three C's of Credit

A Banker Tells How He Analyzes a Borrower's Resources

In these troublous times of reconstruction and readjustment, the thoughts of business men fondly turn to money. Where, how and when to get it are the big questions when times are unsettled and buyers are wary. The following article is an interview with the president of one of the large banks of the middle west and answers the above questions. It pertains particularly to the trade, since the inspiration came when the writer entered the office of this same bank president, as a prominent gravel producer was going out.—E. B.

"CHARACTER, capacity and capital, but the greatest of these is character. Upon these three fundamentals is all credit, especially banking credit, established."

Thus spoke Dwight A. Mitchell, president of the Citizens' National Bank, as Lew Gray, a gravel producer, and one of the younger business men of his city, closed the door.

"It's an old trinity," said Mr. Mitchell, "but it is as true today as it was before the war, regardless of the fact that our business morals have suffered somewhat because of the war.

"There goes Lew Gray, who has character and capacity to an exaggerated degree, and he has some capital; but there are some things he might do that would give him a bigger line of credit, without strengthening any of the three big fundamentals. Just to illustrate. Lew is in his business to make money. That is all right as far as it goes, but it doesn't go far enough. He has lost sight of the big thing. He should be in the business to build up the biggest business of the sort, in the city first and then in the state. To hang with the money. If he accomplishes the latter, he will just naturally get all the money he wants. And his credit among the bankers would be much larger.

"I know another man here in the same line of business who also has plenty of the three fundamentals and yet his credit might be improved through devoting more attention to that particular business. I watched him for the first ten years and it seemed he had a wonderful future in his business. It grew and he watched it carefully. But then he began to invest some of the surplus in other lines. That marked the turn of the tide. His first business has stood since that time. He is making money, but as a business man, I count him a failure. His attention is all divided among a dozen different enterprises. He has to be gone from his office to various board meetings of other businesses and the business he got his start in has been left to drift along. The most foolish financial adage I ever heard was 'don't put all your eggs in one basket.' Put them all there and then carry the basket is what it should have been. Take the really big men, not only in this business, but in any other line, and you will find that they concentrate on one thing. That is one of the first steps toward financial and business success.

"But to return to the money-borrowing problem. The average business man does not know how to borrow money. He does not know how because he does not know what the banker looks at before he lends him money. If the tables were turned and the business man sat in the banker's chair thousands of them would not lend themselves money

"Let us first take up the process from the time the business man enters the banker's office until the money is loaned. The prospective borrower has a financial statement purporting to show the condition of his business. Too many times, it does not show the

financial condition by a long shot. In the place of giving us a correct financial statement, too many only put in those things that look nice. If the borrower has signed other person's financial paper we want to know that just as much as we want to know what notes he, himself, has outstanding. If he has a comprehensive financial statement, he will have in it accounts past due as well as the accounts receivable that current month. We want to know how his collection department is operating. If he wants to impress us, he will list his notes receivable separately, I mean segregate the ones he knows or believes to be all right and those about which he may have some doubt. That leads us to believe that he wants to give it to us straight.

"Every financial statement tendered to a banker should show EVERY credit and EVERY liability and the credits should not be overestimated nor should the liabilities be under-rated. Both his fixed and current assets, together with his fixed and current liabilities, should be truthful.

"Here is something the average borrower does not know. There is an old rule among bankers to the effect that a business is a pretty safe risk, character and capacity of its head being normal, if its current assets are from two to three times the current liabilities. By current assets I mean stock on hand, either market or cost, accounts receivable, notes receivable—good ones—and cash on hand. By the current liabilities I mean accounts payable and notes payable. If this ratio is shown, truthfully, in the statement he need not worry greatly about the credit status of the business. If this ratio is not shown, then we go into the remainder of the credit statement mighty carefully and we also go into other things in the same manner. Our credit manager immediately finds out a lot of things the man does not know about. The loan is held up for a day or two. The credit manager finds out something about the plant value, the trend of the market, the demand, the time the man spends with his business, whether he is dabbling in stocks for speculation and a lot of other things, which may appear foolish to you, but which aids us in re-establishing in our minds confidence in the man's character, capacity and even in his capital.

"Here is another little tip. A man in Lew Gray's same line came to us one day with a financial statement. He had his stock listed at a certain price. There had been an erasure and somehow I got to wondering what had been in that line before. The more I wondered, the more I wanted to know. It was a good statement and doubtless, had it not been for that erasure, he would have got his money with no delay. We made an investigation and his figures on the stock he was carrying and ours did not compare at all. He did not get his money and he failed the next week. And the money would not have helped him save his business. Since that time I have had a horror of erasures of any sort.

"Too many business men get the idea that bankers are operating to provide them permanent capital. We are here to tide them over certain periods of the year, when they want to stock up, to help them take their discounts and to save and make all the money possible, but it is not our function to lend a man the money needed to go into or do business and then forget about it except at interest paying time. We want that man to clean the slate. There may be some other man wanting to enter business who needs this money that is tied up. Consider the farmer. His redeeming feature is the fact that about twice a year he cleans up his paper. If necessary he has a big sale and does it that way. That is why the next year he can get more money to carry him over."

Lansing Concern Busy

Gravel Pit Kept Going Producing Material for Many Big Building Jobs

THE Central Michigan Gravel Company, which began operating last February at Lansing, Mich., the plant of the Burrell Gravel Company, is working a bank that runs about 60 feet high and covers the most of eighty acres.

The business that this firm does is mostly bank gravel, but they have installed a new washing plant to take care of the poorer grades of gravel. Outside of this no other changes have been made since their taking possession except the erection of a pit office and extensive repairs to the equipment.

The gravel is taken out with a 1 yard Thew shovel which loads the material on cars that are hauled by a Davenport and a Vulcan locomotive direct to the bins or to the washing plant, where delivery is made by motor truck.

An Erie shovel is also handling the job of stripping overburden in a part of the pit where the top dirt is heavier than common. The method of disposing of this top dirt is to dump it into a swamp at the far side of the property.

In the recently built washing plant has been installed a Smith Heavy Duty Washing Screen which does all the work formerly covered by a shaker style screen.

A feature of this pit that saves considerable time and lost motion is the trestle used for loading gravel into railroad cars. This trestle permits a train of dump cars to get an elevation sufficient to allow easy unloading of the material into the freight cars which come in at either side and at a lower level.

With this equipment it should be possible to maintain a production of about 600 yards per day.

The plant, by the arrangement of bins shown in an accompanying photograph, is able to load twenty trucks at one time and building conditions in Lansing have been keeping them pretty close to the limit of their capacity for some time.

Contractors are kept much busier there than anywhere else in Michigan, or perhaps in the country generally. There is considerable home-building activity in addition to the work on the Durant Motors plant. A number of office and business blocks are also going up.

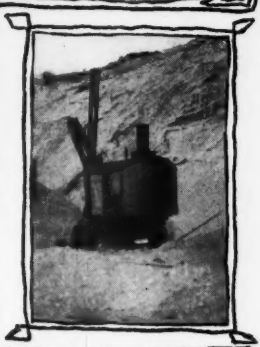
Any further information about the design and operation of the pit may be secured from Mr. Harry E. Robinson of 1200 No. Logan Street, Lansing, Mich.

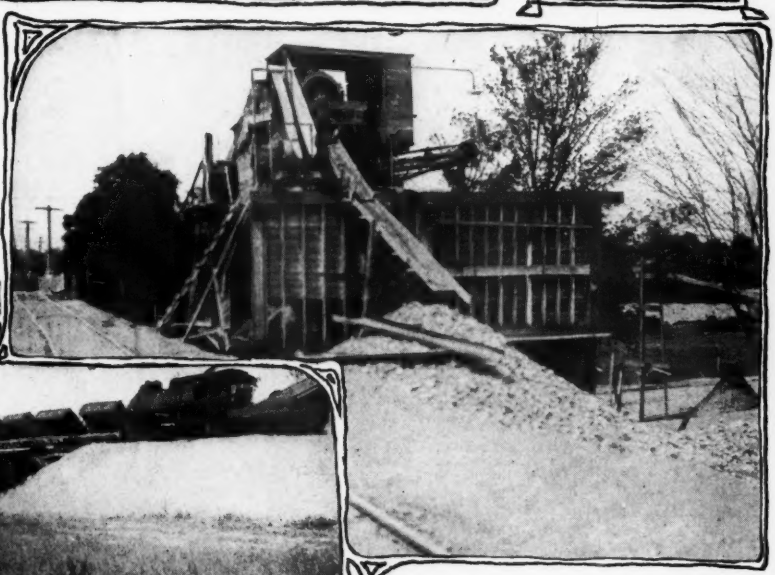
Bessemer Cement Output Stated

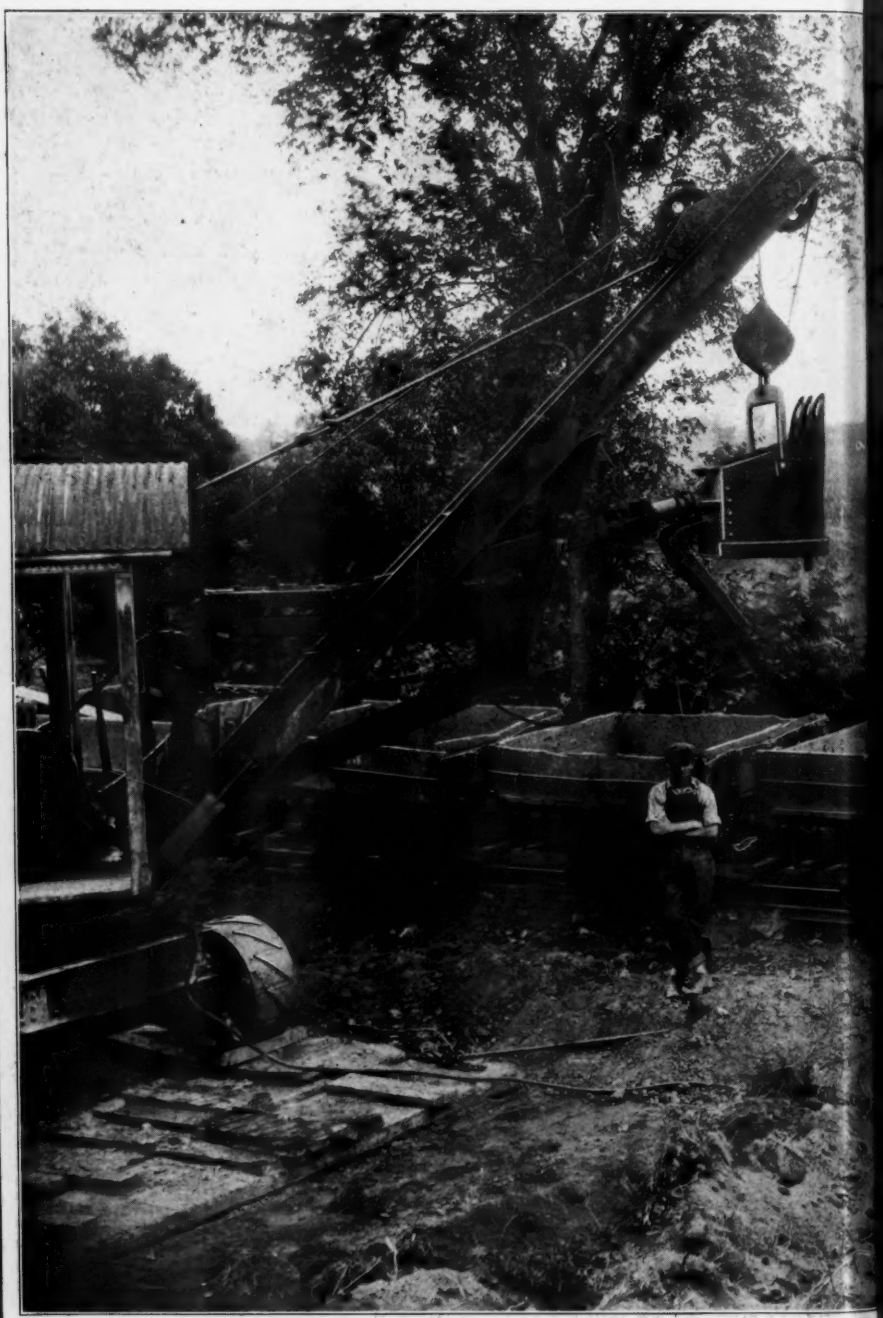
The Bessemer Limestone & Cement Co., Youngstown, O., produced 96,000 barrels of cement in August and shipped 106,000 barrels. Its plant came into production about eight months ago and has a rated monthly capacity of between 85,000 and 90,000 barrels. Its agricultural limestone business is improved owing to increased farmers' buying for fall seeding and to inquiry for flux stone from the blast furnace industry, reflecting expectation of larger pig iron demand. The company more than earned its preferred dividend in June and July, and August earnings were nearly as large as the preceding two months combined.

The Ohio C. Barber Lime Co., Barber, Va., is now operating at its local lime works, with products of natural deposit, requiring no burning. The material is being mined at the rate of about 150 tons per day. It is said to contain from 92 to 98 per cent pure calcium carbonate, is as quick to act as burned lime, and without caustic qualities. The company is capitalized at $600,000 and is an interest of the Ohio C. Barber Fertilizer Co., Akron, Ohio.

Views of the Central Michigan Sand & Gravel Co's Plant, Lansing, Mich.

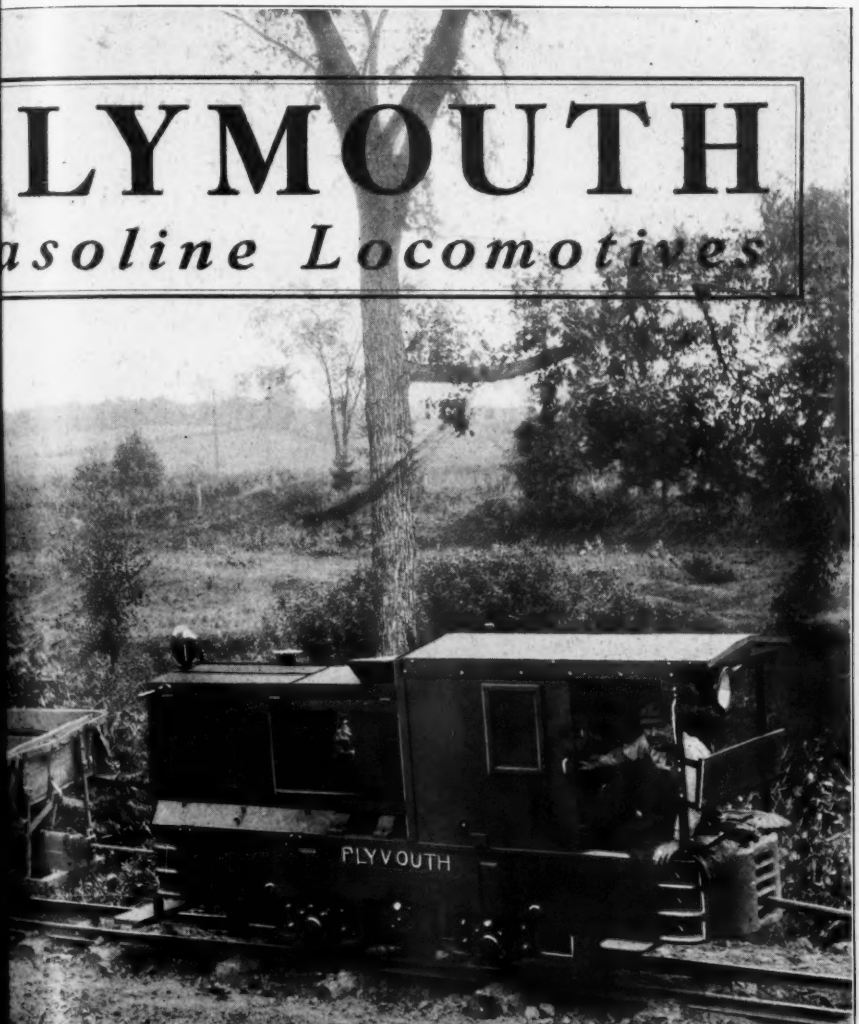






LYMOUTH

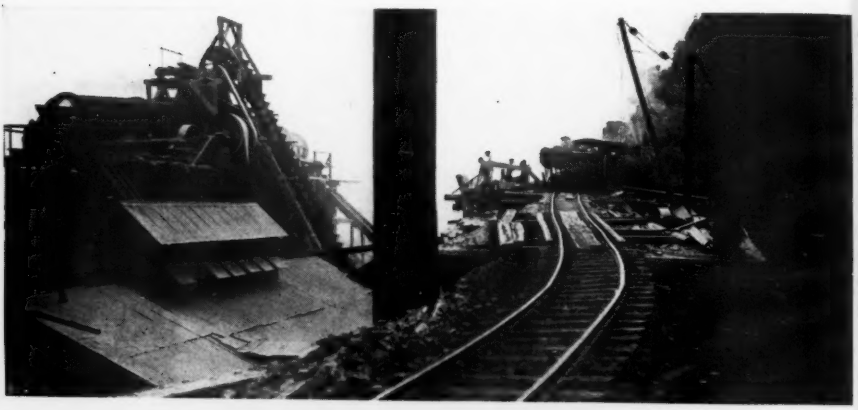
asoline Locomotives



Showing a six-ton Plymouth Locomotive in the pit of the Hydraulic Press Brick Company at Menomonie, Wis. The superintendent of the plant says the Plymouth could deliver the clay for double their capacity, or 200,000 daily. Ask the manufacturers, The Fate-Root-Heath Company, Plymouth, Ohio, for data on this sturdy Locomotive.

Views of Gilboa Trap Rock Quarry

Lambertville, N. Y.



New Trap Rock Quarry

THE new crushing plant of the Gilboa Trap Rock Quarry at Lambertsville, N. J., is one that careful design and expert management have put upon a high plane of efficiency. It is owned by the Delaware River Quarry and Construction Company, which has been operating a plant at Moore Station, N. J., since 1893. Besides specializing in the manufacture of Belgian paving blocks, broken trap rock, road metal and railroad ballast, the concern conducts a general contracting business of some size.

This new Lambertville plant, which began operation last June, was designed by Mr. R. A. Montgomery, president of the company. It was erected by the firm's own men, including Mr. Louis Rooks, Plant Superintendent; Mr. Richard Montgomery, Vice-President, and Mr. Rufus Mathews, Civil Engineer and Superintendent of the Moore Station plant.

The capacity at Lambertville is four tons per minute. The largest size is screened through 3-inch holes.

In the quarry there are two Bucyrus shovels, one of 70-ton and the other of 40-ton capacity. The stone is taken from the shovels up a 4 per cent incline by steam locomotives, and is delivered direct to the initial crusher. Delays in moving cars are avoided by a continuous track, each train dumping its load in the machine and then continuing around through the remaining portion of a complete circle and back to the shovels.

Six Farrel crushers then take up the work of reducing the stone to the desired sizes. The initial crusher is 36x48 inches, the second 24x36 inches and the remaining four machines each 13x30 inches. The second crusher has a special swinging jaw which does effective work almost all the way to the top. Top opening is about 12 inches.

The largest crusher is set high enough above the others to cause the material to flow by gravity from one machine to the other through the various stages of the reduction process. The angle in the chutes from the larger crushers is about 45 degrees.

The entire output is carried by one elevator, which takes the material up to the screens and dumps it on top of the bins. This elevator is 70 feet between centers, is fitted with a belt 43 inches wide and has buckets 42 inches wide and 18 inches in the back and front.

There are two manganese screens, each 45 feet in length. It is the intention of the management later to erect steel buildings over these screens. This will be done when a little time can be spared from the work of production. The plant has no scalping screen, as the stone is crushed sufficiently fine to pass through the screens. What rejections or tailings there are drop back by gravity from each end of the screens into the 13x30-inch crushers.

The bins have a capacity of about 1,000 tons and are so arranged that cars may be loaded from underneath or at the side. These bins will be finished later in concrete.

The power for the entire plant is furnished by four boilers of 180 H. P. capacity each. From these are run one Watts, Campbell compound condensing engine, which will develop around 1,000 engine horsepower.

The arrangement of the works shows a broad experience and good foresight on the part of the designer. Everything has been built permanently and well and should operate to the entire satisfaction of everyone concerned.

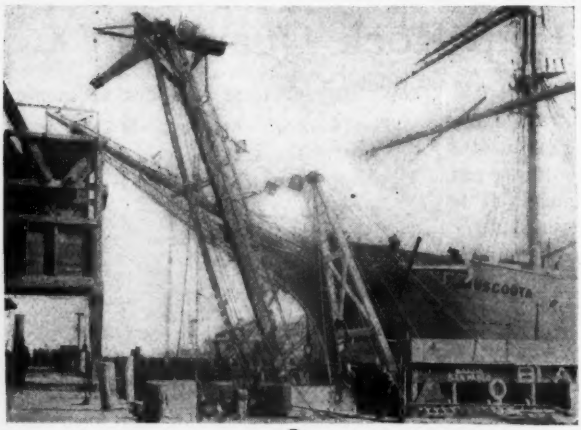


Figure 1

Hauls Sand to Frisco

This Barge Delivers to Vessels and Storage Yards

PHOTOS Nos. 1 and 2 show an especially designed barge owned by Blake Brothers of San Francisco, used in transporting crushed rock and sand from a quarry across the bay from San Francisco, to vessels, and other points along the San Francisco water front.

Photo No. 1 shows the barge delivering crushed rock into the bunkers of the Blake Company near Pier 46. Photo No. 2 shows the barge about to discharge crushed rock into the hold of a vessel. Recently 100 tons of sand was delivered into the hold of a vessel for shipment to Europe.

This barge has a hull 35 by 135 feet in plan and 10 feet deep, giving it a displacement of 400 tons. It carries a row of bunkers elevated above its deck and with their bottoms sloped from both sides to the center line of the row.

The under side of the hopper bottom of the bunkers is 7 feet above the bottom of the hull, thus providing for the installation of gates arranged 10 feet apart in center of the bunkers. A 24-inch belt conveyor runs the full length of the row of bunkers and is fed with rock through these gates. The conveyor discharges at the forward end of the hul to the boot or a 30-inch bucket elevator mounted on a boom 65 feet in length. This boom consists of a pair of 12-inch channels latticed together and trussed between its ends. It is hinged at the bottom to a heavy cast iron disk that is pivoted so that it can rotate. This arrangement secures a universal joint so that the outer end of the boom may be placed at almost any angle within a horizontal range of 180 degrees. The boom is suspended about 20 feet from its end by a fall block with a wire rope passing through a four-sheave block, and

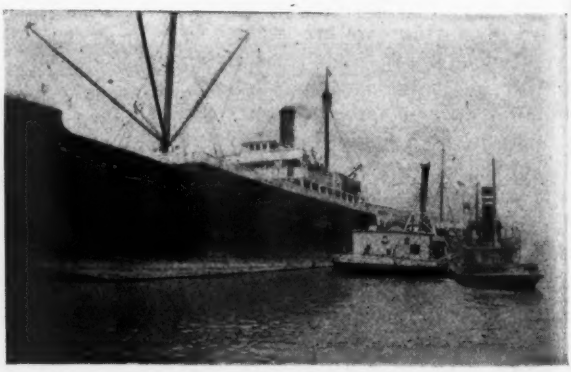


Figure 2

wound on a crab at the base of an A frame which carries this sheave. This method of rigging enables the boom to be raised and lowered, and guys on both sides hold the boom in place after it is set. The elevator discharges at the top through a hopper into steel chutes that are built with telescoping sections so that their length can be adjusted to suit conditions. A gasoline engine is installed on the barge to operate the conveyor and bucket elevators. An electric motor at the top of the boom also may be used to drive the equipment when the barge is anchored and where electric current is available.

At one end of the barge is a galley, and bunks for the crew who live aboard. A tug boat is maintained to tow the barge back and forth between the quarry and points along the San Francisco water front.

Granite Quarries Active

Figures for 1920 Show Large Increase Over Previous Year

INCREASED activity in the granite quarrying industry in 1920 as compared with 1919 is indicated by reports received by the United States Bureau of Mines from operating companies throughout the country. The reports show that 12,735 men were employed and that each man averaged 251 working days during the year, or a total of 3,199,073 shifts for all employees. As compared with 1919, these figures represent an increase of 2,269 employees, or 22 per cent, and an increase of 550,253 shifts, or 21 per cent, while the average working days per man shows a loss of 2 days in 1920. Accidents resulted in the death of 22 men and the injury of 1392. Based upon the number of men working and the period of their employment, the accident rates were 2.06 killed and 130.53 injured per thousand men employed (300-day workers). For the previous year the corresponding rates were 1.81 and 124.70.

In the quarry pits proper, as distinguished from the outside rock-dressing plants, 9,369 men were employed (7,380 in 1919) for a total of 2,295,241 shifts (1,857,231 in 1919), an average of 245 days per man (252 in 1919). Of these employees 21 were killed and 879 were injured, showing a fatality rate of 2.74 and an injury rate of 114.89 per thousand 300-day workers. The injuries were mainly due to the following causes: 184 by flying objects, 142 by handling rock at quarry face, 99 by machinery, 77 falls or slides of rock or overburden, 67 by haulage equipment, 52 by falls of persons, 51 by timber or hand tools, 42 by falling objects, 25 by explosives, and 20 by drilling and channeling.

At the outside rock-dressing plants 3,366 employees (3,086 in 1919) worked 903,832 shifts (791,589 in 1919), an average of 269 working days per man (257 in 1919). Accidents resulted in the death of one man and the injury of 513, representing a fatality rate of 0.33 and an injury rate of 170.26 per thousand 300-day workers. The principal causes of nonfatal accidents were: 158 flying objects, 67 machinery, 47 falling objects, 42 handling rock by hand, 33 falls of persons, 30 nails and splinters, 28 hand tools and 28 haulage.

Seven of the fatal accidents occurred in California, 5 in Pennsylvania, 3 in Minnesota, 2 each in Vermont and Wisconsin, and one each in Colorado, Maryland and New Hampshire.

California also led the nonfatal accident list, with 361, followed by Wisconsin with 203, Massachusetts 175, Vermont 172, Minnesota 118, Maine 87, and New Hampshire 82.

Granite quarries usually employ about 16 per cent of all quarry workers in the United States.

The Southern Sand and Gravel Co. has been incorporated recently in Memphis, Tenn. for $100,000.

Expect Good Fall Trade

Eastern Market Is Increasing In Prosperity from Month to Month

By Our Eastern Correspondent

THE marked increase in building operations in the New York district and neighboring sections is resulting in a corresponding advance in the distribution of sand, gravel, building stone and affiliated products. There has been a marked increase in sales, and the outlook for still greater business during the fall season is excellent. Producers in the Cow Bay and other local sections are maintaining good average outputs, while dealers are holding up stocks to the necessary point.

With the encouraging aspects of the situation in this vicinity, it would seem as though the corner is being turned, and that only the customary winter lull in the industry will be experienced in the coming months, rather than a stagnation of trade coupled with guess-work for the future. The revival, unquestionably, is here to stay.

Another turn to the benefit of the industry is the action of the Interstate Commerce Commission in authorizing eastern carriers to make a reduction of about 18 per cent in the existing freight rates on sand, gravel and crushed stone in this territory, effective October 1. The decrease is applicable virtually between all points in eastern trunk districts, including New Jersey, Pennsylvania, Delaware, Maryland, and parts of Virginia and West Virginia. The new rates will substitute a 15 per cent increase over the 1920 rates for the 40 per cent increase placed into effect in August last.

Prices in the New York district hold well at prevailing levels. There is no indication of any decline, and if anything, rock materials may follow the lead of common brick in this market which is now advancing from $15.00 to $16.00 a thousand, wholesale. Gravel, 1½ and ¾-inch size, is quoted at $2.25 per cubic yard in cargo lots, with dealers retailing the material at $4.25, delivered on the job. Sand is $1.25 a cubic yard, as against a figure of $1.50 a year ago this time, wholesale; in the retail market, it is being sold at $1.80 and $1.90 a cubic yard, while high grade white sand sticks to the figure of $5.00 a cubic yard, prevailing for many months past.

For crushed stone, 1½ and ¾-inch material, building supply dealers are asking $4.00 a cubic yard, delivered. In the wholesale market, prices hold at $1.90 and $2.00, with fair average demand prevailing at the present time. Cement has found a popular level at $3.00 a barrel, retail, less bag rebate, and good quantity distribution maintains at this figure. Finishing hydrate lime is selling for $17.00 a ton at the warehouse, while common barreled lime is quoted at $3,69 in the wholesale market.

The Falconer Coal, Gravel & Supply Co., Falconer, N. Y., has been organized with a capital of $50,000, to operate a local sand and gravel business. The company is headed by M. Linquist, G. Josephson and T. Anderson. It is represented by D. L. Carlson, Jamestown, N. Y.

The Superior Lime Corporation, Brooklyn, N. Y., has been formed with a nominal capital of $5,000, to manufacture lime and kindred products. The company is headed by S. Briggs, M. and B. T. Solomon. It is represented by A. H. Goodman, 1482 Broadway, New York.

The Connecticut Valley Trap Rock Co., Inc., Hartford, Conn., recently organized with a capital of $275,000, will operate a plant in this section. G. S. Ballard, Frank Stone, and D. C. Mc-

Carthy, 18 Asylum Street, Hartford, head the company.

The New York Consolidated Slate Corporation, Salem (Washington County), N. Y., has been chartered under state laws, with capital of $150,000. to operate slate properities in this district. The incorporators are H. A. Matot and E. J. Stanley. The company is represented by S. E. Everts, Granville, N. Y.

The Superior Sand & Gravel Corporation, a Delaware corporation, has filed notice of organization to operate in New York. The company is represented by A. F. Danielson, 188 Montague Street, Brooklyn.

The International Cement Corporation, 342 Madison Avenue, New York, has arranged for a note issue of $1,500,000, the proceeds to be used for general operations, plant expansion, betterments, etc. The company is now operating a total of six plants, with aggregate annual capacity totaling 4,500,000 barrels.

Sand companies in the vicinity of Millville, N. J., in the Maurice River district, are resuming activities and a number of large orders recently have been received for material. This section produces a big tonnage of molding sand for steel mill service, and a few plants are working on orders of this character for steel interests in Pennsylvania.

The Keenan Structural Slate Co., First National Bank Building, Bangor, Pa., has work under way on an extension to its mill at East Bangor. Alterations and improvements will be made in the existing plant. The work is estimated to cost close to $15,000.

The Eastburn Scofield Co., Morrisville, Pa., is maintaining active operations at its local rock quarries and sand pits. Large shipments are being made and orders on hand, it is said, insure production at a good status for some time to come.

The Wrightsville Stone & Lime Co., York, Pa., has been incorporated under state laws to manufacture lime, and deal in sand, stone and kindred products. Ralph D. Hoffman, York, is treasurer.

The Blumont Slate Co., Slatington, Pa., is arranging for the early closing of its plant for the winter period. The mill will shut down earlier than usual this year.

The Pennsylvania Lime Products Co., Philadelphia, Pa., has arranged for an increase in capital from $5,000 to $27,000 for proposed expansion.

The Pittsburgh, Pa., market in the sand, gravel and crushed stone industry is operating with a good, firm tone and encouraging trend to distribution and sales. Prices remain at present levels without immediate indication of change. Gravel is being sold for $1.60 a cubic yard, f.o.b. barge, with $2.00 asked for river front delivery, and $3.00 upwards where hauls are necessary. Building sand is holding close to the same quotations, while crushed stone varies from $5.00 a ton upwards, according to size.

The Iron City Sand Co., Pittsburgh, is operating under good production in the Glen Osborne district, and the company's towboat, "P. M. Pfeil," is being used to haul barges of sand and gravel from this point to the Pittsburgh market. The Keystone Sand & Supply Co. is maintaining active production at Coraopolis, and the "Victory," of this company's fleet is pressed into active service for many cargoes of material to the Pittsburgh port. The fleet is also making delivery of tows of sand to Woodlawn and other nearby sections. The Rodgers Sand Co. has been operating its towboat, "Twilight," for the local trade, and sizeable distribution has been made during recent weeks. The company's diggers are in active production. Other sand and gravel producers are operating under good capacity at the present time.

Eastern Rates Reduced

Other Official News from the National Capital

By Our Washington Correspondent

THE Interstate Commerce Commission has approved applications of carriers in eastern trunk line territory for authority to make heavy reductions on five days' notice in rates on sand, gravel and crushed stone applicable upon interstate traffic between practically all points in trunk line territory, including Pennsylvania, New Jersey, Delaware, Maryland, and portions of West Virginia and Virginia. The new rates are to be published to become effective October 1. The basis to be employed in constructing the new rates is 15 per cent higher than the rates in effect prior to the general increase of August, 1920, thus substituting a 15 per cent increase for a 40 per cent increase. A large volume of movement of these commodities for roads, buildings and other construction work will be affected and it is expected that the annual reduction in transportation charges will be much in excess of a million dollars, says the Commission.

A statement commenting on this reduction has been issued by the National Asociation of Sand and Gravel Producers. It says:

"The action of the railroads serving the states of Pennsylvania, New Jersey, Delaware, Maryland, Virginia and West Virginia in reducing rates on sand, gravel and crushed stone substituting an increase of 15 per cent in lieu of 40 per cent over the rates in effect prior to August 26, 1920, comes too late to stimulate building and construction work for this year. Contracts for road work have been let and sufficient time is not allowed before cold weather sets in to start new building projects. The best that can be hoped for is that the limited reductions which the carriers are making will prove an incentive to stimulate the construction industry for next year.

"The reduction contemplated by the railroads amounts to only 18 per cent, whereas freight rates on sand, gravel and crushed stone have been subjected to increase of 15 per cent in April, 1918; 20 cents per net ton in June, 1918, and 40 per cent on August 26, 1920. These commodities have always been limited to short hauls in the Eastern Territory on account of high rates. The total increases which have been made in the rates applying between short haul points amounts to 116 per cent on a pre war rate of 37 cents; 138 per cent on a prewar rate of 42 cents and 149 per cent on a pre war rate of 48 cents per ton, so that as compared with the increases which have been made the reduction now proposed of 18 per cent is not sufficient to enable these commodities to move freely over the railroads."

The executive committee of the National Association of State Highway Officials, representing all the states, is to meet here September 29. It is understood that road building officials among the state highway departments all over the country intend to appeal to members of the Senate and House to pass the bill introduced by Senator Phipps of Colorado, which would turn over to the states a quantity of road building equipment in the possession of the War Department.

The road-building equipment ordered to be turned over to the states by the War Department, under the Phipps bill, consists of 1,500 five-tons caterpillar tractors and 200 mobile machine shop units, for repairing and rebuilding tractors, trucks, etc., used in road building. The War Department has on hand, left over from the war, 4,000 such tractors, alone, in addition to many of the machine shop units, it is stated. The 4,000 War De-

partment tractors, of which the states want 1,500, are admitted by many Army officers to be on the road to obsolescence, and if another war were to occur now it is said that few, if any, of these tractors would be used, in view of the economies that would be had by using the latest type tractor for purely military purposes.

State highway officials have been informed that because of one or two instances where broken-down equipment turned over to states by the War Department had been sold, charges have been made that the states have all sold equipment furnished by the War Department. State officials declare these charges unsubstantiated, and easily disproven on application to the federal bureau of public roads in Washington. This situation, it is said by highway officials, is particularly emphasized in the case of the state of Nebraska. The state now finds it necessary to have about 100 of the five-tons caterpillar tractors. Her citizens are said to have bought liberty bonds enough to pay for 100 still in the possession of the War Department, but she cannot get them from the War Department, even though they are idle. It is stated that all of the states, collectively, now have plans to buy nearly 2,000 similar tractors, in order to carry out their road building programs and put their unemployed labor to work.

On June 30, 1921, the close of the fifth fiscal years since the passage of the Federal aid road act, which is administered by the Bureau of Public Roads, Department of Agriculture, the States and Federal Government had completed 7,469 miles of road, and 17,977 miles were under construction. Including the work completed on projects still under construction, the States have completed work which entitled them to draw on the Federal Treasury for $118,915,515. There is also a balance allotted but not yet earned on projects now under construction amounting to $66,375,636. Of the two appropriations which have been made for Federal aid there is now only $18,793,544 remaining unobligated. Twelve of the States have obligated their entire allotment and several others have only a small amount to their credit.

During the last fiscal year the total of completed projects jumped from 1,677 to 7,469 miles, and the projects under construction increased from 14,940 to 17,977 miles. The money earned by completion of work has grown from $40,097,881 a year ago to $118,915,515 at the end of the fiscal year. The amount earned during the year was $78,817,634, or nearly twice as much as the amount earned during the four years preceding. The new projects submitted during the year bring the total amount of Federal aid obligated up to $247,956,456, as compared with $100,830,366, which was the amount obligated on June 30, 1920. At this rate it is expected that the small balance of $18,000,000 still unobligated will be taken up in a very short time. The month of June was a record month in every way. The mileage of completed projects increased by more than 1,200 miles, more than twice the amount reported for the month of May. Funds allotted to work actually under-construction increased by $13,670,925.

A new method of treating a local sand to make it conform to the specifications for a concrete road has been adopted by the engineers of the bureau of public roads in charge of California Federal-aid project No. 41. Near the South end of the project no local sand could be found which would conform to the requirements of the specifications approved by the bureau. These prescribed that the sand should contain no more than 5 per cent of material which would pass a 100-mesh sieve. The local sand analyzed about

15 to 20 per cent, which was entirely too high to permit its use.

Instead of falling back upon the importation of suitable sand from another locality the engineers devised a plant for blowing the fine particles from the sand. The device used consists of an ordinary conveyor which lifts the sand to a revolving screen. Material which will pass a one-fourth-inch mesh is discharged into a hopper under the screen and then through a narrow opening into a storage bin below. In falling from the hopper to the bin the sheet of sand passes directly in front of a nozzle which directs against it a current of air from a centrifugal air blower. By means of a pressure regulator at the blower the velocity of the air at the nozzle can be so controlled as to blow from the falling sand any desired percentage of the finer material.

The blower is operated by a belt from the same gas engine which operates the conveyor and revolving screen. The whole device is compact and inexpensive. The result is a satisfactory sand obtained at less cost than by any other method. The success of the plan depends, of course, on the dryness of the sand. If it were necessary to dry it the increased cost of treatment might make the importation of suitable material preferable.

The Wisconsin Rapids Sand and Gravel Co. of Wisconsin Rapids, Wis. has been incorporated for $15,000, its shares to the number of 150 selling at $100 each par. Incorporators are Fred Bossert, L. Amundson and Earl C. Bossert. Officers are: President, Louis Laun, Elkhart Lake, Wis.; A. A. Laun, 32nd and Clark Sts., Milwaukee; Secretary and Treasurer, W. J. Taylor, Wisconsin Rapids.

The Wisconsin Mineral Aggregate Association has succeeded in securing plant inspection for some of its members who are shipping on highway work.

New Michigan Cement Plant

The National Portland Cement Co. which maintains offices in the Book Bldg. in Detroit is about ready to begin work on a new plant for the production of Portland Cement at Coldwater Lake, near Mount Pleasant, Mich. Construction will get under way early in November and it is believed that the plant will be ready to operate in April 1 of next year.

The company owns in fee-simple approximately 236 acres of land and holds under option about 160 acres more, bordering upon Coldwater Lake in Isabella County.

The company's engineers have designed a modern plant, to cost about $900,000, which will have an initial yearly capacity of 540,000 barrels. The work has been planned so as to make possible the inclusion of an additional unit which will increase this capacity to 810,000 barrels. The building will be of reinforced concrete and structural steel, of the latest type fireproof mill construction.

The company is fortunate in securing the services of Mr. H. C. Shields as general manager and mechanical engineer, and Mr. Thomas L. Dates as resident engineer and works manager. For the past twenty years both of these men have been prominently identified with the development of the cement manufacturing industry in both the United States and Canada. They will devote their entire attention to the construction and operation of the plant.

Mr. Shields was formerly with the Fuller Engineering Company and the Soper Engineering Company and has held responsible executive positions with some of the most successful cement companies in the country.

Mr. Dates has built and operated some of the largest and most successful cement plants in Canada, with whom he has held responsible executive and administrative positions.

The recently incorporated Badger Sand and Gravel Company of Milwaukee, Wis. has issued stock to the amount of $10,000, shares $100 each par. The incorporators were John D. McCarthy, W. T. Sullivan and Nora McCarthy. The president is John D. McCarthy of 185 Thirty-fifth St., Milwaukee, the Secretary-Treasurer is Nora McCarthy of the same address.

Dallas Business Steady

Highway and Street Paving Is Helping the Industry

By Our Dallas Correspondent

GRAVEL men of Dallas, Texas, and other cities in that section of the state report continued heavy business despite the fact that building operations usually are somewhat slack during the summer season. There have been some disturbing factors which have tended to cause a slight slackening in the trade, but on the whole business has held up and the gravel men are looking to the future full of optimism.

Highway and street paving in and about Dallas is being done on a large scale and this work has brought about the biggest development in the sand and gravel industry. The City of Dallas has ordered an election on a proposal to issue $1,250,000 in bonds for street paving, and in view of the practical certainty that the issue will be approved, street work is going forward on several large contracts. Under the plan of paving streets in Dallas, whereby the property owners pay for paving in front of their property, leaving the street intersections for the city to pay for, this sum of money will make possible a large paving program.

The city is now paving Davis Street from the city limits to a junction with Zang's Boulevard, a distance of more than one mile, and is also paving a large number of streets for shorter distances. The street work now under way in Dallas involves an outlay of something like $2,000,000, and large quantities of sand and gravel are being used. The paving companies are buying most of this sand and gravel through Dallas dealers, and the sand and gravel business has felt the stimulus of these large orders.

Road work in Dallas county is also being pushed ahead on a large scale. The county is in the midst of its program made possible by the issuance of $6,500,000 in bonds for highway construction. Several concrete highways, cardinal roads leading out of Dallas to the four corners of the county, are being constructed. When these are finished, a gravel road will be built as a belt line near the border of the county, entirely encircling the city and connecting all the cardinal roads. The county is near the end of the work called for in the expenditure of the first installment of $2,500,000 of the bond issue authorized and, as soon as this work is finished, the expenditure of a second installment of approximately the same amount will be authorized. Engineers are now at work completing plans for the highways to be built under the second installment and contracts will be awarded at an early date. Considerable repair work is being done by the county with its own force and fleet of motor trucks and teams, but most of the new highway construction is being done under contract. The contractors in most cases are buying their sand and gravel under competitive bids, and the gravel dealers are getting this business. In some cases the county is furnishing material, the sand and gravel being taken from the county's own pits and delivered by the county on the job.

Much road work is also being done in Tarrant, Johnson, Hill and other adjoining counties, and in many cases gravel for roal building is being supplied by the Dallas gravel firms. The J. Fred Smith Company is shipping large quantities of gravel from its pits on the M. K. & T. railway north of Dallas, this firm being perhaps the largest shipper of gravel in this section.

Recent floods in Texas have greatly damaged highways and railway roadbeds, and much repair work and reballasting of tracks will be necessary.

Already negotiations are under way between railroad officials and gravel men for delivery of large quantities of gravel for roadway ballast.

Several new gravel pits have been opened recently in this section. Hill county has opened a new pit from which gravel for road construction in that county will be taken. The Texas Midland railway has also purchased considerable gravel land and is opening pits for taking gravel to be used in ballasting its track from Ennis to Paris, Texas. These pits are in Lamar county.

The threatened labor trouble in Dallas, that held up building operations for a short time, has been settled and building is now going forward at a more rapid pace than before the temporary tie-up. Several large building projects are under way and several others have been announced. Much residence building is also being done at this time, and the local consumption of sand and gravel in building operations is very large. Practically all this sand and gravel is being supplied by Dallas dealers and is being delivered by them on the job, except in the case of a few of the larger contractors who maintain their own fleets of motor trucks.

The price of gravel remains firm, the demand being sufficient to prevent any delcine during the dull season. Prices vary somewhat, ranging from $1.00 to $1.25 f.o.b. cars at pit, and from $2.50 to $3.50 for delivery on the job.

Mr. Gottfried Hilder Passes Away

PIT AND QUARRY regrets to announce the death of Mr. Gottfried Julius Hilder, founder and chief stockholder of the Hilder Granite Company of St. Cloud, Minn. Mr. Hilder passed away at St. Cloud on September 3rd. The industry loses in him a man who has contributed consistently to its upbuilding for many years.

Sand for Fertilizer

Other Notes of Current Events in Indiana

By Our Indianapolis Correspondent

ACCORDING to W. K. Miller, president of the Granite Sand and Gravel Company, which has several large plants situated near Indianapolis, a series of practical tests of the productive qualities of the sand taken from one of the pits of the company showed the sand to contain mineral properties that are highly desirable as fertilizer for the four main crops of the state—wheat, corn, oats and clover. Tests of this sand made on the John Routon farm near Canby, Ind., showed unusual results in the way of increased yields and Mr. Routon claims that the use of the sand, in addition to its fertilizing qualities, made the soil more friable, sweetened the soil and made it hold moisture, supplying a mineral food the virgin soil formerly contained. Many other farmers also have used the sand and have found that it showed greater productive qualities in the raising of corn, wheat, clover and oats than any other product they have thus far used on their farms.

The trade here is vitally affected by a recent ruling in superior court to the effect that Indiana Motor Vehicle registration law, encated by the last Legislature, is constitutional. In addition to all regular fees and assessments, users of trucks, with the exception of farmers, are required to pay a special fee of $15 per ton capacity on each truck. A test case backed by commercial haulers was fought out in court and the truck users lost. It was undecided whether the case would be appealed to the state supreme court. The users of trucks in Indiana declare that 95 per cent of the truck traffic are on city streets and not on country roads. The special fee collected goes for the maintenance of country roads.

The limestone interests in Indiana are making a concerted effort for higher duties in the tariff bill to protect their production from importation from France and England. The Indiana Limestone Producers declare that the freight on rough building blocks from Indiana quarries to New York is 98 cents a cubic foot, which is about 200 pounds, while the cost a cubic foot is from 55 cents to 80 cents, according to the grade and the cost of production is only from 30 cents to 40 cents. The cost of freight to New York and Boston is greater than any other grade of limestone produced. The request for higher duties was made by representatives of the 38 companies in Southern Indiana operating 32 quarries and 58 mills.

A course in vocational stone work, approved by the state superintendent of industrial training, has been added to the curriculum of the high school at Bedford, Indiana, and a set of stone working machinery will be installed in the new vocation stone room under construction at the building. The board of education decided on the course with the co-operation of the Bedford Stone Club, and the Bedford Foundry and Machine Company.

The Stone Products Company of Bedford, Ind., has filed a final certificate of dissolution with the secretary of state.

The directors of the Consolidated Stone Company have decided definitely to locate their new plant, which will take the place of the plant recently destroyed by fire at Bloomington, in Bedford. The mill, to be built adjacent to the Dugan mill, will be constructed of steel and stone and will be the most modern and best equipped mill in this country. The Chamber of Commerce has been asked to look after the housing question, as the mill will mean homes for 500 people.

Three men were killed and a fourth was injured, probably fatally, in a gravel pit cave-in recently at Wolcottville. More than fifteen men were working in the pit, which is operated by the Northern Indiana Gravel Company, near quitting time. Suddenly a bank of gravel gave way, burying the four men under tons of rock.

Officials of the Ingalls Stone Company at Bedford, Ind., said they believed the Golden Rule policy between employers and employes established last April, had solved many difficulties and was directly responsible for the present prosperity of the company and employes.

A Golden Rule jubilee was held recently in connection with the dedication of the new $350,000 mill of the company, at which 400 local employes and their families were guests. Tables were set for 800 persons in the new building, which replaces the one destroyed by fire three years ago, and a feature was the presentation by the employes of an American flag 28x40 feet, which is to be hung in the mill room. D. C. Ingalls, ex-Mayor Albert J. Fields, Evangelist Scoville and the Rev. S. S. Lappin were the principal speakers on the program.

The stone company operates beside the new mill, the Robin Roost and McLaren mills and three large quarries, constituting one of the largest stone companies in the Bloomington district.

"In discussing costs of production recently with a few of our members, I was led to believe that we are not extending these costs of production over the twelve months of the calendar year. In other words, what we produce in the active season must be extended or figured to take care of December, January and February or whatever months the plant is shut down and overhead, depreciation, obsolescence and other costs continue irrespective of plant operation. This particular feature of figuring your costs should be given serious consideration."—O. C. Hubbard, Secretary, Wis. Mineral Aggregate Assn.

No Kick in Louisville

Work Enough to Carry Along a Fair Volume of Pit and Quarry Business.

By Our Louisville Correspondent

WHATEVER may be said about housing shortage and slow times in the construction industries in other districts, there is really no serious complaint that can be made about the progress in Louisville during the fiscal year of the building inspector's office ending with August 31. Figures just given out show a total estimated cost of construction for the fiscal year of $6,039,900, which is a very good showing under the circumstances. The total is less in dollars than the previous year but it is figured that decreased cost explains this, and on the whole the volume of building operations makes a good record. The big item in it was homes; and while in some places people may have built more garages than homes, this is not true of Louisville, because there were 455 home permits during the year at an estimated cost of $2,339,750, as against 301 garages with a total cost of $147,000. There was a good showing, too, in factory buildings, warehouses and other heavy structural work calling for a large percentage of sand and gravel, so there is really no complaint on the score of building operations.

It is in street and road work that the trade has of course had its big opportunities, and while it has not seen boom times, the business has rounded out very well. At this writing there is lots of street work going on in the city and everywhere throughout the state road building operations are under full headway. That is not all, either. Contracts are to be let at Frankfort, September 28, for about two million dollars' worth of additional road construction which is to be started in the spring. This work will include 27.7 miles on the Ohio River road, 18 miles on the Mayo Trail, 10 miles on the Pikeville-Williamson road, and a mile and a quarter of paving in Stearns, and some state-aid work in Bracken, and State Maintenance work. There is to be 18 miles in Lawrence County, 12.7 miles in Breckenridge County and 8.9 miles in Union County from Morganfield to Henderson.

Because the bond of George T. Miller, Lebanon, Ind., was considered unsatisfactory new bids are being taken on seven miles of paving of the Dixie Highway in Madison County, which involves about a quarter of a million dollars' worth of work.

The week of September 12-17 was State Fair week, the people of Louisville playing host to thousands of visitors coming in the city to attend the State Fair here. Considerable additional interest was awakened this year by the building of a new $300,000 merchants and manufacturers building, which was erected of concrete, using Speed cement and in which many merchants and manufacturers made displays this year.

Among the people in the stone and sand industry making displays were the R. B. Tyler Company of Louisville, showing brick and tile as a feature but including a presentation in some form or other of many lines of activities, such as quarrying, road building, asphalt, building material, etc.

The Ohio River Sand Company also had a booth and made an interesting exhibit, showing its products and telling the story of its separation and many different uses.

The Louisville Cement Company has been doing some interesting movie advertising, showing at the local play houses pictures of scenes and operations at their quarries and lime burning plants over on the Indiana side of the river. It was an interesting show-

ing that belongs in the class of educational films and held interest as well as furnished a splendid display of the actual work of quarrying stone and burning lime, including the shooting of a blast of some four tons of dynamite to break down a great ledge of rock.

Among the local sand and gravel yards there is a pretty busy scene these days because they have a fair volume of local trade right along and a good percentage of carload trade going to the surrounding territory. In fact, they are kept busy enough serving the current needs of the trade that they have not yet accumulated their winter stocks, nor have they added materially to the volume of stock in the yards during the past few weeks. There is plenty of time yet, however, and all the yards expect to get stocked up for the winter because they continue operations in the river until about the middle of December.

J. E. Lloyd, of the E. T. Slider Company, says they have been pretty busy of late, both in the local trade and in the carload trade to dealers in the surrounding territory. In fact the fall trade in carload business seems to have developed nicely and promises to keep active until cold weather.

They have been handicapped some in stocking because they were having to rebuild their dock boat here.

Taking it all together the sand and gravel people here feel like they have made a fairly good season of it, better perhaps than in most other localities throughout the country.

Among the quarry people the activities have been mainly confined to portable plants connected with road building contracts and to railway material operations. The old commercial quarry work as such has been pretty seriously handicapped but the many special demands for road building and the improved activities among the railroad and ballast work has helped out considerably.

Reorganize Signal Mt. Cement

John L. Senior of Michigan Is Elected President

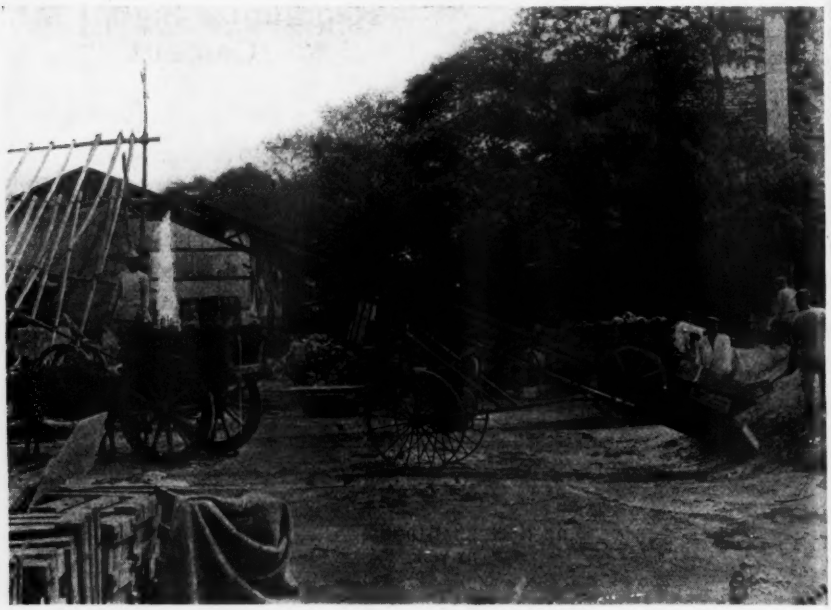
JOHN L. Senior, of Cement City, Mich., has been elected president of the Signal Mountain Portland Cement company of Chattanooga, Tenn., and has assumed active direction of the corporation, according to an announcement made on August 31st by Ralph Law, secretary of the company. The announcement is the result of negotiations that have been going on since last December.

Mr. Senior is also president of the Peninsula Portland Cement company, Cement City, Mich., and is a director of the Trinity Portland Cement company, of Dallas, Tex. He is also interested in other large cement companies and is a member of the board of trustees of Cornell university.

Announcement was also made by Mr. Law, of the company's intention to start operations on a new building to house the cement plant at Glendale about the first of October. It is believed by officers of the company that materials and labor have reached the low level. The early erection of the plant is desired in order that the company may start operations by the first of the year and get into the 1922 market.

The plant in Glendale will be built on the line of the Chattanooga Traction company, with whom arrangements have been made for transportation. The details of the new plant have not as yet been worked out. The plant, however, according to Mr. Law, will be the most up-to-date and modern plant for this type of production in the southern states. The company is capitalized at $3,000,000.

Shipments will be made to all points in the south and southwest,



Loading Sand in India with Portable Belt Conveyor

"In India's Sunny Clime"

Haiss Portable Belt Conveyor Fraternizes with Coolies

The Tata Construction Co., Ltd. of Bombay, India, a unit of the Tata Iron & Steel Co., who control probably the largest steel mines in India, have been using two Haiss portable belt conveyors for about a year. The machines are employed for unloading sand and brick from barges at the railway cars which stand alongside the slip, and also for loading sand from ground storage into bullock carts.

These machines are operated by kerosene engines of 5 H. P. and have given very good results. Assuming that the native labor in India receives one tenth of the wages that laborers do in this country, and taking into consideration the fact that conveying machinery is a money saver and labor aid under these conditions, it can be readily seen how much more of a saving can be made in this country by using labor saving devices as compared to hand methods.

The belts are 25 feet long, equipped with a 14 inch wide four ply Goodyear rubber belt, and have a rated capacity of approximately one yard a minute. They are mounted on two wheels which are equipped with roller bearings, making it very easy for two men to move the belt to different parts of the yard.

Simplicity in construction and operation is the keynote of a successful machine used in countries in Asia, and the fact that the Haiss Belt Conveyors are used there with great success shows that the machine is a very satisfactory one for the use for which it is intended.

Standard Sand and Gravel Company has been organized at Kewaunee, Wis., with a capital of $10,000. Ignatius J. Fidder, Charles L. Peterka and George Shackett, Kewaunee, are the incorporators.

Changing a Quarry From Hand to Steam Shovel Methods

DURING the extremely difficult operating period of the war and immediately thereafter, many a quarry operator turned his attention to the question of eliminating hand work and substituting the steam shovel. Now that the pressure of labor shortage is removed, many operators are no longer considering this expense although others realize that sooner or later the laborious work of sledging and loading stone by hand must give way to machine methods.

The purpose of this paper is to discuss the various local conditions and their effect upon the choice of proper equipment. The particular problems may be summarized as follows:

1—The Quarry
   a. Nature of the stone.
   b. Heght of the quarry face.
2—Size and type of shovel.
3—Transportation system.
4—Crusher.
5—Special problems of the Lime Manufacturer.

Each of these items must be taken in its relationship to the others and at best, any solution is a compromise.

The nature of the stone has a most important effect upon the size of the crusher. A strong-bodied stone of high crushing strength and few cross fractures requires a crusher with a larger opening than a softer more friable rock, irrespective of the size of shovel and cars.

No one should consider changing over his quarry from hand methods to steam shovel without making a thorough examination of the practice and equipment at various plants. And when such a survey is made, it is necessary to give most careful attention to the character of the rock in the quarry where the changes are contemplated. It is one of the most important phases of successful installations, and is the one most likely to be overlooked.

A face of less than forty feet is preferable for any size of shovel. A certain standard practice has been developed in the large fluxing stone quarries between New Castle, Pennsylvania and Youngstown, Ohio. These quarries are all operating on horizontal strata. In some cases the height of the face will be fifteen feet, in a few cases as low as seven and sometimes as high as twenty-two feet. The shovels used are the railway type handling dippers from 2½ to 4 yards. Drilling is done on the top and at such distance back from the face that these large shovels can clean up the entire shot on one passage. Since the quarry face is of a uniform curvature, the development of the quarry consists of a gradual spiraling out which brings a very high efficiency of operation.

In higher faces, or with the use of smaller shovels, it becomes necessary to make two or more trips past the front of the blast in order to make a complete clean-up of the loose rock. There are some objections to this system, as it is apt to make the production of the shovel inconsistent. By blasting against a shot that is already out, it is often possible to maintain a loose condition of rock which facilitates the work of the shovel and at the same time maintain a considerable depth of broken rock so that the shovel always has plenty of material to work upon.

The higher the face, the greater is the tendency for the stone to come out insufficiently shattered. This becomes a very serious problem with stone which has a natural tendency to come out in large pieces. There-

fore it is not desirable to drill the holes back at a considerable distance from the front as this condition would thereby be aggravated.

Undoubtedly the best size and type of steam shovel for quarrying purposes is the railway shovel running on a track and mounted on eight wheels, with a dipper capacity of about three yards. These shovels are rugged, of a standard type and should be used if other conditions around the plant permit.

It scarcely pays to use a railroad shovel of less than 2½ yards capacity. With the smaller sizes, the shovel becomes slow in moving heavy stuff nor is it flexible enough to get out of the way for heavy shooting. In addition the cost of laying the tracks for the shovel and for the paralleling line of industrial track would be no greater for the big shovel than it would be for a smaller one.

It is not usually feasible to use a shovel on traction wheels of a size greater than one yard. In some quarries this has been done where there is very little dirt in the stone so that the quarry floor offers a very good roadway for a heavier shovel. The ¾ yard shovel on traction wheels will weigh approximately twenty tons and in general this is heavy enough load on any ordinary quarry floor.

Small shovels on traction wheels offer attractive possibilities to a quarry operator under the following local conditions:

1. A small tonnage, say less than 800 tons per day.

2. Where it is desired to split up the tonnage into smaller units either for reliability of stone supply or because of the nature of the rock that must be taken out from the different points in the quarry.

3. When an industrial system is of light weight which would prohibit the use of a heavy shovel.

4. When the conformation of the quarry prohibits the rounding out of the quarry in a uniform curve so that the railway shovel cannot be advantageously employed.

5. Where the floor is firm so as to give good roadway for a shovel on traction wheels.

From the present outlook there would appear to be no field between the small traction shovels and the large railway shovels. Therefore the investigator is practically limited to these two extremes of installation. With the perfecting and cheapening of the caterpillar tread, there may be a future for the full revolving shovel of about 1½-yard capacity. It is to be noted, however, that a full revolving shovel of large size must necessarily be sluggish as compared with the railway type shovel which moves only its boom.

The following points regarding a transportation system must be taken into consideration:

1. Relative size of car and shovel.

2. Size of the unit of train movement.

3. Relative size of car and crusher.

When using heavy railway type shovels, the gauge of the industrial track should be not less than 42 inches and standard gauge of 4 feet 8½ inches is preferable.

A point not usually considered is that a high car is cheaper to load than a low car and that high cars may more safely be used on a wide gauge track than upon a narrow gauge. The economy in loading high cars is due to the fact that when it completes its working stroke, the shovel usually has its dipper well in the air. This allows the runner to drop his load without the necessity of lowering the dipper down to the car.

The size of the unit of train movement is not always given the consideration which it deserves. For good practice the train load of stone handled on one movement should

equal at least twenty minutes of the nominal capacity of the shovel. As for example, a railway shovel with a nominal daily capacity of 1200 tons equals 120 tons per hour equals 2 tons per minute, should be served by a train carrying forty tons of stone. In practice, with a daily average of 1200 tons, this forty ton train should be filled in from ten to fifteen minutes time and the balance is lost time in moving the shovel, shifting trains, hard digging, etc.

In these figures may be noted one of the fundamental reasons why the small shovel can compete with the large one. Very few operators of railway shovels will serve them with a forty ton train. The operator of a small shovel has no difficulty in serving it with trains of ten to fifteen tons each. In fact, with a specially designed car, the Cedar Hollow Plant of the Charles Warner Company has succeeded in making train units of twenty-one tons. This was accomplished on a track of 24-inch gauge which is altogether too narrow even for shovels as small as ¾ yard.

The relative size of the car and the crusher is of utmost importance and most frequently overlooked. A large car demands a large crusher, all other conditions being equal. If the car is of such small size that its load will not fill and cover over the top of the crusher, then obviously there is much less opportunity of jamming and arching.

This condition is much helped by having a considerable length of chute between the point of dumping the car and the mouth of the crusher. This thins out the load and causes the large stone to go in endwise, thereby permitting the use of a larger car than would otherwise be possible. An apron feeder or similar device will accomplish the same purpose.

It would be well to reiterate here the important factors that have bearing upon the proper size of the crusher. We constantly hear discussed the relative size of shovel and crusher as if this relationship were the only or the most important point. But the most important considerations of determining the size of the crusher are the nature of the rock itself and the size of the car. The size of the shovel also has an important bearing but certainly less than the others.

Steam shovel service is exceedingly hard on cars. Any car of the "contractor type" or the rocker dump type will not be durable when used with steam shovels. It is necessary to have a type of car in which a considerable portion of the bottom is flat and resting directly upon a heavy decking on the truck. Otherwise the dropping of stone will be constantly knocking the body out of shape. This type of car requires a power dumping device at the crusher. Spring journal boxes are very helpful in saving a car from rough treatment.

In most installations, the crusher is selected for the size of its opening rather than for its capacity. Since the jaw crusher has a large mouth opening for its cost and output, it is usually selected for all installations of lime plants. The order of importance of different items which go to determine the size of the crusher is approximately as follows:

1. Nature of the stone.
2. Size of the car.
3. Size of the shovel.

The effect of all of these has been elaborated above but it would be well to inject a word of caution at this point. Experience has shown that most installations have crushers which are too small for their purpose. Quarry operators install large shovels to secure economy at the quarry face, probably skimp a little bit on the size and type of car and end up with a crusher which is very much too small. The easiest thing to change in a

quarry is the size or type of shovel. Usually the most difficult thing to change is the crusher itself on account of lack of head room, necessity of additional foundations and larger conveying and elevating machinery. Therefore it would appear to be better to put the money into the crusher and if skimping must be done, skimp on the shovel and the rolling stock. Many good installations have been seriously hampered by delays at the crusher itself.

The largest size jaw crusher that can be shipped and erected with a one piece frame is the 48x60 inch. Any size larger than this must be shipped knock-down on account of railroad limitations. As a result this size crusher is now being frequently installed. It is being successfully fed by shovels of various sizes running from a ¾-yard traction shovel at Cedar Hollow Plant of the Charles Warner Company up to 3-yard railway shovels at the plant of the Security Cement & Lime Company and at some of the Ohio lime manufacturing plants. This crusher is not quite large enough for this work. But it has been the economic limit for these plants on account of the excessive cost involved in the purchase and installation of the larger sectional frame crusher. There is occasional difficulty at all the plants using this crusher which is usually due to the nature of the rock or failure to supply a sufficiently long chute from the car dumping point to the crusher mouth.

The gyratory crusher should only be considered where enormous capacity is desired, say 4,000 tons per day or more, such as is required in large fluxing stone operations.

The producer of fluxing stone or the manufacture of cement may possibly more advantageously use a gyratory crusher on account of the larger capacity required and because of the size to which the stone is ultimately reduced. The lime manufacturer, using vertical kilns has a different problem. He wants a maximum percentage of "one-man stone". A jaw crusher is the best machine to give this product as it will let slabby stone through which is not objectionable to the lime manufacturer. It will also make a maximum percentage of big stone and can advantageously be set with a wide jaw opening.

This very fact however brings about additional difficulties when preparing stone for vertical kilns. The individual pieces of stone are so much larger than is customary in normal crusher practice, that new problems are introduced in the conveying, elevating, screening and subsequent handling of the material.

Larger and heavier units are needed throughout the system than would be justified by the mere question of tonnage handled. The crusher itself is set with a wider opening so that it usually operates much above its rated capacity and this condition prevails to such a marked extent that it can only be partially alleviated by slowing down the crusher.

There is no objection to the rotary screen for screening out the "one-man stone" for vertical kilns. Various devices have been proposed and installed in anticipation of the unsuitability of the rotary screen. This is a mistake, as rotary screens are still the best machine for this preliminary screening. It is well however to make certain detail changes from orthodox practice. The scalping screen for removing the one-man stone should be large in diameter, very short and placed at a comparatively steep angle. Its rotative speed should be slow. For example the screen of the Cedar Hollow Plant of the Charles Warner Company is an open end type, six feet in diameter, twelve feet long of which two feet is blanked off leaving only ten feet of actual screening length. Its inclination is two inches to the

foot and rotates at 12 R.P.M. Although these details are rather abnormal from the crushing man's viewpoint, nevertheless greater satisfaction could be gotten by having the screen shorter, steeper and of slower rotation.

For the lime manufacturer the handling of one-man stone from the bin may of itself become a serious problem. This is largely dependent upon the size of the one-man stone desired as well as the nature of the rock itself. If there is little use for the smaller sizes of stone, then the operator aims to make the highest percentage possible of one-man stone. This requires a coarse setting of the crusher so that the one-man stone will run as large as possible without interfering with successful burning in the vertical kilns. If coupled with this, the stone is strong-bodied, then there is a great deal of difficulty in getting the stone out of the bin.

From a broad viewpoint, sooner or later all stone will be produced by machine methods except in the small operations. Irrespective of the minor peaks and valleys of labor supply, the universal tendency is to substitute the machine for laborious manual work. At the present time the shovel and crusher cannot compete with hand work for small tonnages. Even in moderate tonnages savings are small and the advantages to be gained are largely contingent. The shovel and crusher installation is less subject to loss of output on account of rainy weather or because of excessive heat in summer time. It also places the proper preparation of stone more definitely in the owner's hands than is possible when stone is prepared by hand work. These contingent advantages alone will usually justify a shovel-crusher installation.

How Costs Should Be Kept

By DANIEL J. HAUER

NO one questions today the value of a costkeeping system for the production of sand and gravel and in quarry operations, for all seem to agree that modern business methods demand that costs be kept. The question is how the costs should be figured.

Recently the writer received a letter from a reader of this journal asking about a costkeeping system, and more especially if costs should be kept as a special account in the ledger, and then with the known production of a week or month obtain a unit cost, or if it is better to keep costs separately each day and a record of the production and thus obtain from such figure the unit costs.

If it is desired to know costs principally to set a selling price, and incidentally to make comparisons of costs over long periods of time, then to make the costs a part of the bookkeeping system is proper, for such records can be referred to at any time and it is easy to figure out a selling price.

Unfortunately for many operators in sand, gravel and stone, it is not a question with them of figuring costs, adding such a profit as they see fit and thus establishing a selling price. Instead, competition may set the price for which they must sell their products, and the margin of profit may be small.

As costs will fluctuate due to many causes, mistakes made one day and repeated the next may use up all the profits. Thus if these mistakes are to be detected at once and rectified so that a profit is to be made, costkeeping must show unit results daily.

The writer's experience, covering many years in these operations as

well as that of a cost analysis engineer, has convinced him of the need of this kind of costkeeping.

He also believes in showing results in bookkeeping, but the daily costkeeping should be supplemental to bookkeeping. Books should be kept to show many items of costs, and more especially overhead costs.

Thus the cost of the plant, and repairs and renewals, can be shown, not as a general item, but for each unit or kind of plant.

Thus there can be one account to show the plant for excavating, another for transporting, another for crushing, or washing or grading, and so on through the list. One account will show the cost of power, while office and other general expenses can be divided into different accounts. The same with labor. Even the bills for supplies and materials can in many cases be charged to various accounts.

These things can be done by key numbers. These things are an individual's choice and naturally each man will do it his own way.

To keep costs as supplemental to bookkeeping and be able to analyze them each day means to devise some costkeeping forms. These may be gotten up in an elaborate manner so that each item can still be entered into the bookkeeping system, but this is not necessary. Instead there need be but a few simple forms to keep the time and number of men working at the different operations, likewise machines, etc.

Each man in charge of an operation can be supplied with these forms and it means only a few odd minutes now and then to set down the record. At the end of the day he makes the final records, puts down the totals, and after signing, the various reports thus made are tabulated on a special form and analyzed, the units of work being shown. To the costs thus figured, can be added the overhead charges taken from a standard form, and the total unit costs are thus found.

These can be entered either on a large sheet or in a special book and compared one with the other and with a standard cost set down at the top of the sheet.

The variation of a cent or the fraction of a cent in the cost of any one item can be detected and as this is done promptly, it is possible to find out why the cost has gone up or down. If it has increased, then steps can be taken to reduce it; if the price has gone down a new standard is set, and the reason for it may be found and steps taken to maintain it.

This is the great value of a costkeeping system, to aid in managing an industry, and this means meeting competition and yet make a profit.

Such a costkeeping system will give excellent results, yet in no way interfere with the bookkeeping. The fact is this costkeeping can be done by a clerk, not even bothering the bookkeeper about it if this is found desirable. However it is well to have this work done under the supervision of the bookkeeper.

If a company has more than one plant, or has its main office away from the plant, these records can be kept at each place so that one office has a tab upon the other and each day the leading officials of a company know whether money is being made or not.

The white sand of the seashore near Jacksonville, Fla., will be used in the manufacture of glass, according to B. R. Kessler, secretary of the Jacksonville Chamber of Commerce, who announced the organization of the Tidewater Glass Company for that purpose, with a capitalization of $1,150,000.

The Interlachen Sand & Gravel Co., Interlachen, Fla., recently organized with a capital of $30,000, will operate local sand and gravel properties. An extensive tract will be developed. George E. Welch is president, and J. H. Wylie, secretary.

Plant of the Clinch Mountain Silica Sand Corporation

New Silica Sand Company

Clinch Mountain Silica Sand Corp. Has Fine Deposit

THIS corporation has just completed one of the most up-to-date plants for the production of Silica Sand.

It is located in the Clinch Mountains near Mendota, Va., on the Appallachian branch of the Southern Rwy. They own about 200 acres of mountain which is practically a solid block of very pure white silica sandstone rock. Samples contain as high as 99.75 pure silica from which the highest grade of flint glass can be manufactured.

The rock is quarried 4,000 ft. from the base of the mountain and is conveyed to the plant by means of an aerial cableway constructed by A. Leschen & Sons Rope Co., of St. Louis, Mo. At the plant the rock is crushed, pulverized and screened to sizes, then stored ready for shipment. The storage capacity is 1,500 tons and it is the expectation of the operators that they will be able to produce over 300 tons per day.

This corporation has also purchased and expects to install in the near future a Silica Sand grinding plant, to reduce the sand to a fine powder for use in the manufacture of chinaware and kindred products.

Mr. E. T. Scrutton is the general manager with offices at the plant in Mendota, Va., and Richmond, Va. He will be pleased to mail samples of his product on request.

Hardinge Company Revises Catalog.

Owing to the large demand for literature, the Hardinge Company, New York, has found it necessary to revise Section 1 of its No. 7 catalog, which is now available. This section deals with the principle of operation of the conical mill, and gives a general description of its uses in the industrial, mining and special fields. Those wishing copies should state in what class of grinding they are interested, in order that they may receive information dealing with their particular class of requirements.

A new concern which has started business in Detroit is the Farmington Sand & Gravel Co., 3974 Lincoln avenue.

Wisconsin Lime and Cement Co., Chicago, has increased its capital stock from $200,000 to $1,000,000.

Cement Output Increases

Production for August Was 15 Per Cent Above Average

PRODUCTION and shipments of Portland cement in the United States continued to increase during August, and according to available statistics scored new high records for that month. The August production exceeded the average for August, 1917-1921, by about 15 per cent. Production for the first eight months of 1921 was about 99 per cent of the quantity produced during the corresponding period of 1920 and exceeded the average for the first eight months of 1917 to 1921 by about 8.5 per cent.

As is usual in summer, the August shipments exceeded production, and the total for the eight months just ended was equivalent to more than 99 per cent of the record quantity shipped in the first eight months of 1920. The average for the same period during the five years 1917-1921 was exceeded by about 9.5 per cent.

Stocks of finished cement at mills at the end of August were approximately 8,280,000 barrels, compared with 8,941,000 barrels on January 1, 1921, and with the average of about 9,600,000 barrels for August during the last five years.

The production of clinker (unground cement) also established a record for August, the output being the excess of 9,300,000 barrels. Clinker production for the eight months amounted to slightly less than 63,000,000 barrels.

These statistics, prepared by Ernest F. Burchard, of the United States Geological Survey, are based mainly on reports from producers of Portland cement and in part on estimated data. They indicate that the present demand for cement is greater than might be expected in comparison with that for other mineral commodities, and that in the face of many handicaps to production supply is nearly keeping pace with demand at the height of the construction season.

The Bureau of Foreign and Domestic Commerce, Department of Commerce, reports that imports of hydraulic cement in July amounted to 3,454 barrels, valued at $9,562; the total for the first seven months of 1921 was 49,264 barrels, valued at $184,577. The exports of hydraulic cement in July were 81,091 barrels, valued at $293,960; the total exports for the seven-month period were 764,433 barrels, valued at $2,958,280.

A New Gravity Screen

The Simplex Screen Company, whose offices are in the Felt Building, Salt Lake City, Utah, is building a screen for crushed stone which operates by a correct application of the law of gravity.

The equipment consists of a framework containing a number of bars to each of which is secured a series of screening teeth. Each of these bars, with its set of teeth, resembles a comb, the whole machine resembling a series of combs, arranged with the free tooth ends of each comb resting on the next bar below. Each alternate tooth of each comb is offset and there are no cross wires.

The screen is designed to prevent clogging, permit the easy renewal of worn parts without disturbing other parts, and at the same time make possible a close classification of the undersize.

The screen operates without the use of power; it grades the stone which passes over its inclined surface with no aid except that of the gravitational force which carries the material across it.

The Milwaukee Crushed Stone Company of Milwaukee, Wis., has just been incorporated for $10,000, issuing 100 shares of stock of $100 par value. The incorporators and their Milwaukee addresses are as follows: William T. Vanderboom, 115 Ninth St.; Frank E. Waldron, 508 Caswell Block; Horace P. O'Hare, 140 Twenty-third St.

CALDWELL

SERVICE

HALF a million dollars worth of well selected stock, constantly maintained, and an organization keyed up to the theory that plant efficiency is measured by the number of orders shipped on the day of receipt, accounts for Caldwell service.

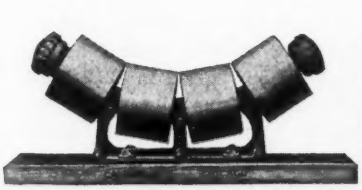
If you need gears, sprockets, transmission machinery, Helicoid Conveyor or any of the Caldwell specialties promptly, wire Caldwell, or call up the nearest Link-Belt office. You will find Link-Belt Company offices in all principal cities.

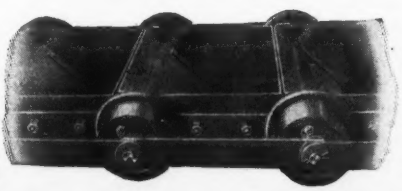
H. W. CALDWELL & SON CO.

LINK-BELT COMPANY, OWNER

CHICAGO, 17th Street and Western Avenue

DALLAS, TEXAS, 709 Main Street NEW YORK, 50 Church Street





Final Cement Figures

Largest Output in 1920 in History of Industry—More Than 100,000,000 Barrels

THE production of Portland cement in 1920 was 100,023,245 barrels, exceeding that in 1917, the next highest year in production, by 7,209,043 barrels. This amount was an increase of 24 per cent over the production in 1919—80,777,935 barrels. The stocks at the mills increased from 5,256,900 barrels at the end of 1919 to 8,941,046 barrels at the end of 1920.

Estimates of the production and shipment of Portland cement in 1920 published by the United States Geological Survey February 14, 1921, were only about 0.3 per cent and 0.02 per cent, respectively, higher than these final figures for the year, compiled under the supervision of Ernest F. Burchard, of the United States Geological Survey, Department of the Interior.

The shipments in 1920 amounted to 96,311,719 barrels, valued at $194,439,025, as compared with 85,612,899 barrels, valued at $146,734,844, in 1919, an increase in quantity of 13 per cent and in value of 33 per cent.

Of the 27 states in which Portland cement was manufactured in 1920, 21 showed an increase in shipments and 6 showed a decrease as compared with 1919, and 25 showed an increase in production and 2 showed a decrease.

There were increases in production in all the commercial districts and increases in shipments in all except three as compared with 1919, and yet the estimated Portland cement manufacturing capacity utilized during the year was only about 66 per cent.

Four plants that were formerly active manufactured no cement during the year, one each in California, Kansas, New Jersey and Virginia. Two plants, one in New York and the other in Oregon, resumed production in 1920 after a period of inactivity. One new plant began producing Portland cement in 1920—the Gulf States, at Spocari, Ala. The producing and shipping plants in 1920 numbered 117.

In 1920 the average factory price per barrel for Portland cement in bulk was higher in all the districts and ranged from $1.83 in Indiana and in the Illinois and western Indiana district to $2.46 in Michigan; in 1919 it ranged from $1.62 in Illinois and the Illinois and western Indiana district to $2.08, the average in Oregon and Washington.

The average factory price per barrel for the whole country was $2.02 in 1920, as compared with $1.71 in 1919, an increase of 31 cents per barrel, or 18 per cent. This is the highest average price on record since 1892. The lowest average price recorded was $0.813 in 1909 and 1912.

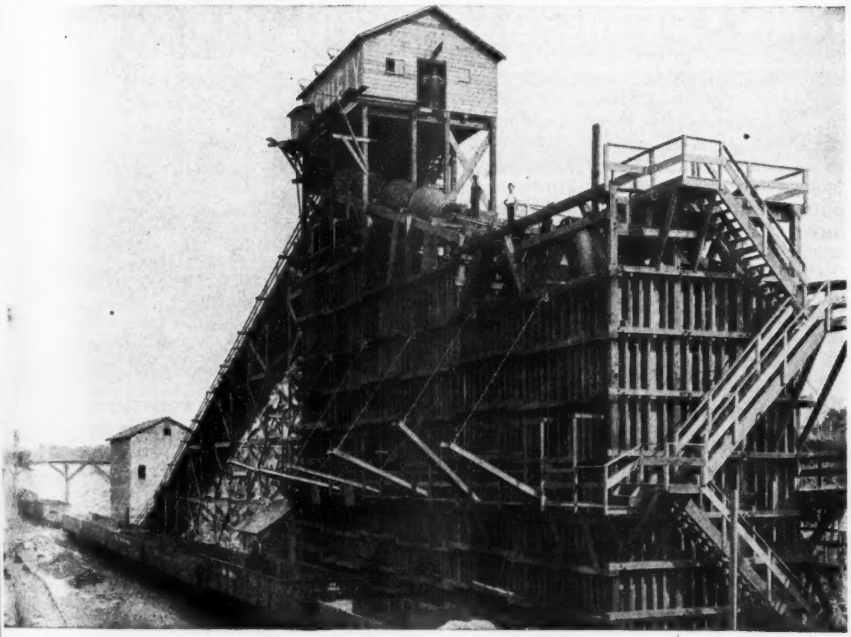
The combined production of natural and puzzolan cements in 1920 was 767,481 barrels, valued at $1,150,890, as compared with 528,589 barrels, valued at $583,554, in 1919. In 1920, 8 plants reported production of natural cement and 1 plant made puzzolan cement.

In its compilation of the cement statistics as summarized above, the United States Geological Survey had the cooperation of the geological surveys of Alabama, Georgia, Illinois, Iowa, Kansas, Maryland, Michigan, Minnesota, Missouri, New Jersey, New York, Oregon, Virginia and Washington.

The exports of hydraulic cement from the United States in 1920 were 2,985,807 barrels, valued at $10,045,369, or $3.36 per barrel, as compared with 2,463,573 barrels, valued at $7,513,389, or $3.05 per barrel in 1919, showing an increase in quantity of more than 21 per cent and in value of nearly 34 per cent. The exports were sent principally to South America the West Indies, Central America, and Mexico.

LINK-BELT

Sand and Gravel Plants



This Link-Belt Sand and Gravel Plant of the J. L. Shiely Co., St. Paul, Minn., is equipped with Dull Inclined Conical Screens and Conical Sand Separators. It is designed to wash and screen sand and gravel as well as a separate grading and washing of crushed boulders. It has a capacity of 3,000 tons daily, including three grades of gravel, two of sand and two of washed crushed stone.

A storage system consisting of two Link-Belt Belt Conveyors with trippers, is provided, to store any one of the seven grades of material produced, in separate piles.

Send for Catalog No. 440 "Link-Belt Plants for Washing Sand and Gravel." It shows what Link-Belt equipment has accomplished for many concerns, under a wide variety of conditions.

LINK-BELT COMPANY

PHILADELPHIA
Hunting Park Ave. and Pa. R. Rwy.

CHICAGO
300 W. 39th St.

New Hercules Powder Booklet.

The Hercules Powder Company has just issued "Volume vs. Weight," a well written and attractively printed little booklet on the advantages of bulky explosives in certain classes of work.

The argument is clearly and logically set forth in ten pages of reading matter which are well worth the few minutes time it would take a user of explosives to go through them.

As Mr. E. I. La Beaume, Advertising Manager of the Hercules Company, says, the booklet presents a phase of the explosive question that the average user seldom considers. However, the points raised are important, for they have a distinct bearing upon blasting costs.

Copies of this booklet may be had by writing to the Advertising Department, Hercules Powder Company, Wilmington, Delaware, or to any branch office of the Hercules Powder Company.

New Catalog of Brownhoist Locomotive Cranes.

In the latest catalog on Brownhoist Locomotive Cranes the Brown Hoisting Machinery Company maintains the same high standards that it has set in previous publications. Text, illustration, makeup and printing are all of very high order and the impression made by the book as a whole is that it is as fine a piece of work in its class as has come to our notice for quite some time.

This 88-page book opens with a well illustrated account of the salient features of Brownhoist construction, then runs through a large number of pages with pictures of Brownhoist Locomotive Cranes at work in all the lines of business where a crane can be used. At the back there are a number of pages of technical data.

The outstanding feature of the book is the beauty of its illustrations. These illustrations—168 in number—are from very fine engravings, beautifully printed on high grade paper and tell the story of Brownhoist service very thoroughly.

A copy of Catalog K1921, as it is called, can be secured by writing the main office of the Brown Hoisting Machinery Company at Cleveland, Ohio, or by sending a request to any of the company's branch offices.

A New Portable Elevator

A new piece of material handling machinery that will serve many purposes around a gravel pit or stone quarry is the McKinney-Harrington Portable Elevator shown in the cut below.

This model is equipped with overlapping steel buckets which work equally well with sand, gravel, crushed stone, coal or coke. It is designed for easy moving from one job to another, operates effectively from one position over a considerable area and may be adjusted to many angles up and down.

Further information will be supplied by the McKinney-Harrington Company of North Chicago, Ill. This company has a competent staff who can analyze the conditions surrounding a material handling job and submit recommendations on the equipment best suited to the purpose.

Link-Belt Reduces Prices.

We have just received from the executive offices of the Link-Belt Company an announcement of an important price reduction, dated September 7th. The announcement reads as follows:

"Link-Belt Company announces a practically uniform reduction of 10% on malleable iron and steel (S S Class) chains, sprockets, buckets and other products, effective at once. Discounts on application."

The Champion Sand & Gravel Co. Marquette, Mich., has increased its capital stock from $30,000 to $45,000.